ELECTRONIC ART MOVEMENT!

VERBUM

VERBUM
3.2
JOURNAL
OF
PERSONAL
COMPUTER
AESTHETICS

4D ISSUE:

Animation on PCs

Multimedia Design

Hyperealism

**Todd Rundgren—
PC Visionary**

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Illustration: Cynthia Marsh

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SUBMISSIONS
For information on how and what to submit and where to send it, see page 60.

PRODUCTION NOTES
This issue of *Verbum* was produced with Aldus PageMaker 3.01 on a Macintosh II. Proofs were done on the Apple LaserWriter IINTX. Final output, on resin paper, was generated on a Linotronic L-300 at 1270 dpi. Page 52 was assembled in QuarkXpress 2.0. All the color screen snapshots on page 52 were converted to TIFF files using Studio 8. The individual images were then separated by Pre-Press Technologies, Inc. using their SpectrePrint I software. The size of the Xpress file was 321K; the embedded separations totalled 13.4MB. The page was output as negative film at 2540 dpi by Central Graphics. Pages 1-4, 17-18 and 33 were run as Lino film negatives at 2540 dpi. Central Graphics and On-LineType of San Diego provided output. *Verbum* 3.2 was printed offset by Pendell Printing of Midland, Michigan.

COVER ART
This issue's cover was designed and illustrated by Jack Davis. He used Enabling Technologies' Pro3D 1.2 on the Mac II to create the various shapes, which were then rendered in Photo Finish, Enabling's new rendering package that provides true phong shading, reflection maps, transparencies and shadows. (The software used was a prerelease 8-bit version; the final release, due this summer, will be optimized for a 24-bit environment.) The reflections within the bubbles were created using GraphistPaint's spheroid effect option. The paint-enhanced 3D images were then combined in Studio 8 because of its ability to overlay objects with variable levels of transparency. The final PICT2 file was converted to a color TIFF file and placed in a Quark XPress page, which contained the type and bar elements. The page was color separated using Pre-Press Technologies software and output as 2540 dpi negatives on an L-300 imagesetter.

FRONTISPIECE
"Virtuality" by Michael Gosney (with Nathan Weedmark and Ed Roxburgh) was created by scanning a live image with a black-and-white video camera and a NeoTech ImageGrabber board on the Mac II. The image (in 256 shades of gray) was then manipulated in ImageStudio for final results.

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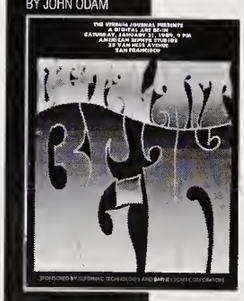
BE-IN HANDBILL
BY JOHN ODAM



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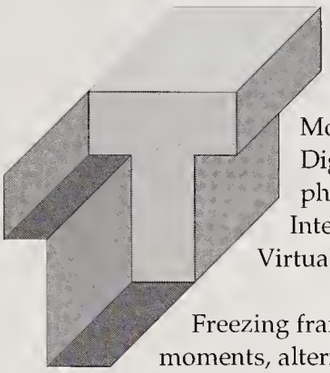
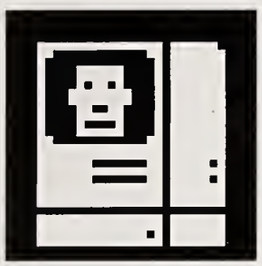
ABOUT THE 4D ISSUE



The fourth dimension. Movement. Motion. Animation. Digital photography, music, video. Interactive media. Virtual reality.

Freezing frames, grabbing moments, altering space, building new worlds – artists are connecting with the dynamic fourth dimension, via their pcs, in many ways. We explore these connections in this issue of *Verbum*, seeking new vistas of cyberspace, but remembering to keep our feet on the (always-moving) ground.

ANIMATED DEMOCRACY
Gregory MacNicol surveys the fast-changing state of the art of pc-based computer animation, from the inexpensive but powerful Amiga to higher-priced, higher-res IBM and Mac platforms. In a companion article, Peter Sørensen points out the trend toward "democratization of computer graphics," as software capabilities developed on multimillion-dollar dedicated systems trickle down to users on easy-to-use, $3000 to $10,000 pcs.



MULTI-HYPER-NEW MEDIA
Best-selling fantasy writer and Apple Computer Knowledge Engineering specialist Tad Williams lets us in on the "Telemorphic Future," where life on the interactive TV net will be rich and exciting.
Elon Gasper, founder of Bright Star Technology, describes the significant contribution that his specialty, "HyperAnimation," is making to this scenario. In "Interactive Artistry" we feature three real-world multimedia projects created with HyperCard on the Macintosh: Incredible Interactivity's Mac II kiosks for Oldsmobile showrooms, Safire and Spalter's Mac SE–based kiosks for Bloomingdales in New York, and InterNetwork's Earth Systems Science presentations.

WORDS LEAVE OFF...
Todd Rundgren, rock musician, and David Levine, game developer, software visionaries both and co-founders of Utopia Grokware, are featured in the second *Verbum* Interview (see last issue's fitting pilot interview with Racter). Their observations on component software and

user-defined reality fit right in. Nicholas Mac Connell, our intrepid programmer/reporter on digital mind expansion (see "Through the Silicon Looking Glass" in *Verbum 2.3*), takes off on an assignment to cover interactive performance art and ends up *being* the performance in a "Cosmic Jam: MIDI Lightning," playing fusion jazz through a 35-watt laser, painting in animated light on a cloudy night sky canvas in Vista, California.

IN SUM – MORE THAN THE PARTS
Our regulars rally round the issue's concept, with Steve Hannaford's "Against the Grain" trying to separate hype from hyper and muted from multi as he researches the practicalities of the new tools and markets. Hyper and 4D Galleries showcase HyperCard poetics and video synthetics. "New Frontier Products" offers all the multimedia product news that fits. Lastly, we are pleased to establish Linnea Dayton's new "Look and Feel" column, with a "Reality Check."

A truly animated, interactive experience, this fourth-dimensional issue of *Verbum* has been an initiation for us (we almost gave up on print and published on a CD-ROM, but figured we needed to wait a while for that). Here's hoping it will be similarly *energizing* for you!

VERBUM NEWS AND NOTES

DIGITAL ART BE-IN
We couldn't resist. A *Verbum* event was needed for the annual migration of artists and technicians to the January Macworld in San Francisco. We found the space – the Amercian Zephyr Studios (a fantastic performance and video art center built into the bottom two floors of a majestic Masonic temple in heart of the City); we found the sponsors – SuperMac and Barneyscan (advanced companies, these); and we put the BE-IN together. Most of our younger attendees thought the idea of a "Be-In" was cool, but missed the connection with the original "Human Be-In" held in San Francisco on January 14, 1967. While the original event was a celebration of all it means to Be, the *Verbum* Be-In suggested that digital art is a very human activity, and celebrated the many forms it can take.

At least 500 showed up to experience corridors packed with people, pastries and espresso, connecting to several dedicated spaces: The 2D Art Gallery featured select silkscreens and prints from various artists, and an invitation to add more to the walls (the room proved too small by night's end). A Multimedia Gallery where Dave Biedny and company showed off their pushing-the-HyperCard-envelope Oldsmobile touch-screen show (see "Interactive Artistry" on page 52), and other hyper explorers showed their stuff and exchanged experiences. We also shot video cameos of attendees here, each expressing thoughts on digital art. In the Meta-Print room we had two Mac IIs with SuperMac 19" monitors and a Tektronix 4693D color thermal printer. Around the corner in the Interactive Gallery, programmer David Zicarelli showed off his graphical/musical brainchild, OvalTune, on a Mac II with great speakerss. The most popular attraction at this dynamic event was the Music Theater, where jazz guitarist/MIDI maestro Peter Sprague kept the audience enthralled for hours with his spontaneous performance and demos of Finale and other MIDI software wonders. By the wee hours of the

PETER SPRAGUE AT THE DIGITAL ART BE-IN

morning, some new characters started to show up, some who looked to be veterans of the original Be-In of 22 years ago, still waiting for what goes around to come around... apparently word got out that some kind of Happening was happening.
The next BE-IN? Be prepared...

IMAGINE TOKYO '89
Plans are in place for IMAGINE Tokyo '89 – "An Evolving International Exhibit of Personal Computer Art." This new incarnation of the IMAGINE show will be held at the prestigious Sogetsu-Kaikan Gallery in Tokyo this September, and will contain over 100 works, including many from Japanese artists. *Verbum* is co-producing the show with Holonet in Tokyo. More later as the event shapes up. (See issues *2.1*, *2.2* and *2.3* for coverage of the previous shows in Newport Beach and Boston). We are also planning shows in Australia and Paris. Ideas for the IMAGINE exhibit are welcomed.

DREAMING OUT LOUD

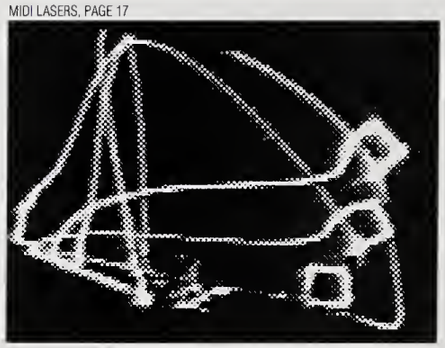
ELECTRONIC TOOL MIGRATION

Perhaps the most exciting thing about the new world of personal computer art is that so many different capabilities are offered to the user. Beyond the ever-evolving world of desktop publishing and graphics, we can tap into animation, music, presentations and interactive multimedia. The original pc-based graphics environments – MacPaint on the Mac, Deluxe Paint on the Amiga, Publishers Paintbrush on the IBM PC, and their more advanced relatives, Adobe Illustrator, Corel Draw, Pro3D, ImageStudio, PixelPaint, PageMaker – allowed us to create and modify text and illustrations, to digitize images, render 3D graphics and build publications. The same kinds of tools, procedures and metaphors we have learned with these programs are being used in the new program categories, thereby giving us the opportunity to naturally migrate into a world of motion and sound and interactivity. In fact, the lines of demarcation between program categories are fading: when the Mac II came out, the first color painting package available was the painting module of VideoWorks; Deluxe Paint 3 on the Amiga and Studio 1 on the Mac are painting programs with animation capabilties built in; Swivel 3D provides for 3D animation by exporting frames to VideoWorks, and so on. Many opportunities await artists and creative computer users as commercial markets develop for these new media forms. To mention a few examples: the use of VideoWorks Director to develop special effects sequences for *Star Trek: The Next Generation*. Sculpt-Animate 4D on the Amiga used to design an animated logo before executing it in final form on an expensive high-end system. Database/presentations in HyperCard for salespeople to use with their portable Macs (soon, very soon). Interactive touch-screen kiosks (see "Interactive Artistry," page 52). Interactive, animated corporate presentations. Hypermedia publication design. HyperCard front-end designs for ultra-user-friendly pc workstations that tell users what to do and help them do it by accessing programs and files automatically. The list goes on.

TRACKING THE
NEW MEDIA VISION

Whole Earth Catalog founder Stewart Brand covered MIT's explorations of the convergence of television, telephone and personal computer technologies in his 1987 book *The Media Lab* (MIT Press). The book paints an exciting picture of interactive, multimedia publishing and advanced telecommunications, with the pc at the heart of the home entertainment/education/communications system. Cable TV, CD-ROM (compact disks for pcs that can hold over 550MB of read-only text, sound and video, equal to seven hundred 800K floppies) and advanced multimedia capabilities on PCs are making *The Media Lab* vision a reality. IBM just released LinkWay, its version of Apple's HyperCard hypermedia erector set. Apple released its CD-ROM drive last year (*The Whole Earth Catalog* [see "New Frontier Products," this issue] is one of 20 or so titles available for it). IBM and Intel (the world's largest chip manufacturer) recently announced their intent to develop "DVI" (Digital Video Interactive) technology for inclusion as a special multimedia chip built into all PCs within two to three years, and rumors persist that IBM and Apple are developing inexpensive systems with built-in CD-ROM drives for the home market.

MIDI LASERS, PAGE 17



Meanwhile, Ted Nelson eschews the notion of publishing on disk in favor of his Xanadu hypertext telecommunications system (Nelson coined the terms "hypertext" and "hypermedia" in the '60s and has chronicled the development of his Xanadu project since 1980 in *Literary Machines*, a "nonlinear" book available from Project Xanadu, 8480 Fredericksburg #138, San Antonio, TX 78229). Although Sir Ted is certainly onto something with the hypernetwork concept, there is no denying the commercial reality of disk-based publication. The big wheels are turning, and there's no turning back. It's not a question of if, but of when, and how much. We at *Verbum* are convinced it's going to be a large and varied new market. And just as aesthetic judgment and creativity were needed in the early days of desktop publishing, so will they be in the field of hypermedia and multimedia publishing we see before us.

– Michael Gosney

THE VERBUM INTERVIEW

TODD RUNDGREN & DAVID LEVINE

On music, component software and Utopia

Todd Rundgren, rock star, programmer and colorful presence at Macintosh developer events during the past few years, has been actively writing code — Hypercode, that is. (For those who worry that Todd has given up on music, he has a new solo album out. No synthesizers — no fooling. And he is still actively producing other bands.) He recently teamed up with programmer David Levine to found Utopia Grokware, a software development firm. Levine is an art school graduate and computer systems engineer who has worked in the games division of LucasFilm for the past five years. His Mac II screen saver, FlowFazer, is Utopia's first product.

Rundgren and Levine are enthusiastic visionaries."Virtual reality" is a concept central to their approach to software development. "Cyberspace" is another central concept, the transcendent computing experience that will come from organically conceived, platform-independent software and more sophisticated I/O devices.

Verbum *interviewed Todd and David at Utopia headquarters (the Rundgren residence) in Sausalito about the future evolution of computers, music as communication, and their own Hypercode software development.*

Verbum: We've seen computing power come down from the mainframe to the mini and then to the micro, and we've seen the use of that power spread to the student, the musician, the artist. The intuitive interface, and the creative applications that allow people to express themselves, telecommunicate with others, publish and so on. Where are we going?

Todd Rundgren: Computers give people a chance to build alternative kinds of reality. And the interesting thing for bringing about major changes in the world — the advance of peace, for example — is that once we start to build realities, we start to question the purpose of our existence, because these invented realities can supplant the normal physical activities that people do with the activities that are representationally the same but don't involve the transfer of matter from one place to another, for example. Having that ability makes people realize how much of life is actually contained inside themselves. It's not really out there but in here. And, once people start to realize that, they may realize the degree of control and power they have. They may stop just going around and being subjected to what happens — being subjected to outside forces all the time. That really it is a result of attitude. Now each of us will have the option of building our own virtual world inside the computer, the opportunity to create something completely. You've never had this option before, so maybe you've never even thought about the responsibility: "If I was God, what kind of world would I build?" Most people never get to that point. And it takes getting to that point personally for people to realize that within their own awareness, they *are* playing God. And they are either playing a pitiful victimized God, or they are playing a God who is aware and in control and informed.

Verbum: When you talk about creating realities with the computer, you're talking about hypermedia?

TR: In a certain sense. It's called hyper-this and hyper-that. But it's just a logical extension, a natural process. Nature will only allow certain things to survive and breathe, you know. Well, one of the things Nature is determined to kill off is the command line, the A prompt. Essentially, Nature has decided that the A prompt is just a lower life form that is eventually going to disappear.

Verbum: Yes. But hypermedia seems to me to be more than just doing away with the A prompt. There is something to be said for this ability to access information with a computer, to be able to learn, to navigate. I'm very excited about the possibilities.

TR: The entire evolution of computers is an attempt to map the way people think into this external medium. And we start to think that there are rules about the kind of world that you're allowed to create in this medium — because there *are* certain rules in this medium, the A prompt being one of them. You know, everyone has a right to create a world that conforms exactly to what he or she wants, as long as the same freedom is extended to everybody else. This is a great opportunity to get all these maniacs with guns off the street, you know. Just plug 'em in and let them blast their brains out.

David Levine: The development of computers can be seen as highly idealistic. It's a nice ideal. You can look at life as a mass hallucination anyway, which is sort of extending and advancing the sophistication of physical medium, of our parent's imagined physical medium. In times past certain subsections of our civilization may have known or had scientific knowledge of communication — say, some sort of telepathic way of being able to instill common visualizations of some imagined reality in a group of people. But if that existed, it's been lost, and we don't know

"...something should happen with a group of people adept at using their machines, working together — above and beyond the sum of their parts." — David Levine

anything, we don't have hard documentation it. We know individual visualization, and the whole Western approach to this group visualization is to slowly, grain of sand by grain of sand, figure out how to crystallize these abilities into our environment. So we developed this technology that lets us communicate across the world. Now we can transfer images and thoughts, and soon we will be able to interact with other people within artificial environments independent of physical proximity, so we're getting back to our ideal state of mass mind, slowly, step by step. Our technology is the stuff out of which we are bringing that ability back to ourselves.

Verbum: And yet still maintaining the right to individuality.

TR: Certainly people have the right to be not connected. To have as much computing power as they can hoard to themselves, as they want. But the rewards of that are the same as being an isolated personality in any kind of situation. If you're determined that you are happy with yourself and nobody else, then fine. No complaints. But I think a lot of people measure themselves — grow — by interactions with other human beings. Some people may be egomaniacal enough to be sure that everything they do is right. But most of us are making constant adjustments based on the feedback we get. And mostly from other people. (Of course we get feedback when we bang into a wall, too, but that's not the kind that has emotional impact on us, you know.) What happens is that we say something and somebody reacts to it, and according to the reaction you may go back and reconsider what you've said and learn something from that. Now, in the same way, people in a corporation or any kind of a group balance each other out, to form a more functional entity than they would be as noninteracting individuals. Like the Beatles. It's the old adage: the whole is greater than the sum of the parts. In some cases when you separate them, they're inseparable. Right? They're up together, you love them.

DL: Maybe what you're getting at is that once humanity is a mass connected together through the computers, we can become something greater than the sum of our individuals.

Verbum: But maybe there's something going on with the world at large and humanity at large — a vision, a new paradigm coming about. And computers and networks will help allow this new paradigm to be accessed by the whole human race.

TR: Well, I think part of it is the ultimate vision of the computer as the genie in the bottle. You know, this fantasy that humanity has —that you have access to this all-powerful being, that will entertain you if you want, and tell you jokes that you've never heard before and stuff like that, but is always your slave. Never, never does it have power over you; you always have power over it. This is a dream that people carry around and sometimes try to bring into their real world in a perverse way, you know, in terms of master race concepts, for example. It's all this interaction of personal power. And one of the things that the ubiquity of computers can bring about is the relief of certain physical constraints that humanity in general suffers from. If you want to take it from the top down, take global warming —that's something that will affect everybody in the world. What is the most effective tool we can use to attack this? How can we deal with this? Well, there are a number of ways to approach it. Will the computer come up with a magical formula that will reverse the entire effect? Or maybe the computer will connect and bring visualizations to people. Cause a change in the way that people behave, which will precipitate the same effect. There's probably a camp that believes that if you get a big enough computer and feed it enough information and get an accurate enough simulation, you'll come up with the specific answer to some problem; but you'll still have the problem of implementation. The computer will give us the answer but it won't implement the answer. But there's the other aspect of what computers do, which is to connect people together and allow them to visualize things in real time. That's what helps with the implementation part of it. It induces people to implement the solutions that you come up with, because they're not just dry solutions.

We have beautiful color displays, you know, and CD quality sound and these are the kind of things that people's lives revolve around — Music, important films — second in impact only to like the traumatic events that actually happen to them in their lives. People like to go to a movie, and their purpose is to see a film that affects them. Even if it doesn't really affect them, they may come away satisfied because they were entertained for the duration of it. But people want to go see *Rain Man* every week, for example. They want to go see a movie that gives them a transcendent feeling.

Verbum: A reality injection?

TR: Yes. Something like a super reality injection. And that's accomplished by the technological mechanism of film: the big screen, the loud sounds, the music and all of the incredible techniques that are involved in coming up with a motion picture. And there's no reason why the greater percentage of the world's population couldn't be devoting their lives to these kinds of things rather than to mining diamonds in South Africa, or totalling up numbers in the New York Stock Exchange. All of this is just busy work. All of this is busy work and very little of it is spiritually satisfying to the people that do it. So this application of technology is a way to make people's lives more spiritually satisfying. And therefore more worth living.

DL: And this manifestation of technology could be a way of thinking about the fact that we're giving computers an existence of their own. Without these created realities, there's nothing there. I mean, there's an arrangement of sand and melted block. There's nothing else there — just crystallized knowledge. It's formed and implemented in such a way that it has endurance in time. The computer represents our crystallized knowledge, and no one has to be there once it's formed. It stays and it continues to function in its planned capacity. But if you see all of our technology as a wave of thought sweeping over humanity, then it sort of gives you a better picture of what's happening. Because, it's in constant transition, in constant flux. What we're doing here may be unique and helpful now. In all probability it will be insignificant in the grand historical picture of things. But we have no choice. We exist now and if we're going to participate in something exciting, this is one of the places to be. But who can say where this will take us? The idea of a completely simulated reality is an old science fiction idea.

Verbum: The holo deck?

DL: Right — on the new *Star Trek*. You have this completely simulated reality, but even though you've got the capability to simulate all kinds of reality, do you find everyone spending all their time in the holo decks, living out their fantasy reality? No. For some reason, they tend to want to go out and have adventures in the real universe instead.

TR: Well, it takes energy, you know. When you have to play God, you're on the job 24 hours a day. If you're going to create your own reality, you have to input the energy to maintain it. You have to design it, you have to maintain it. And so, people are going to want to not play God sometimes as well, hopefully.

Verbum: Well, you guys are programmers. You're creating these reality-simulating tools. I can foresee a few years down the road with this kind of hypermedia environment that people can just plug into an interactive, simulated world, and they can just take off in there for a long time.

TR: It's an opportunity to be — but not in a Christian sense — to be "born again." It's like entering a new reality the exact limitations and possibilities of which you're completely unaware of.

Verbum: Well, I'm sure that somewhere among the possibilities that come with this rebirth will be the opportunity to make

music. So before we go into your own specific Hypercode contributions to personal computer–simulated realities, your work with Utopia Software, could we go back a bit and talk a bit about your music, Todd? I remember well your *A Wizard a True Star* album in the early 70s, an amazing production. After that you formed the Utopia band...

TR: About '74.

Verbum: And you've been recording solo albums as well as the Utopia albums since then?

TR: Yes, with a new one we just recorded coming out in early summer.

Verbum: You've always been a high-tech pioneer with your music, but recently you seem to have been criticizing high-tech music, speaking out against "synthesizer bands" and the drum machine syndrome — you, the original synthesizer kid.

TR: Well, you know — I recognize my own tendency to be antisocial, and to use the technology as a means to further my own antisocial attitudes. I think people are certainly allowed to function in that way, but they shouldn't kid themselves, you know. They shouldn't kid themselves into thinking that they're making music in the sense of the original concept of music. To me, it's like Esperanto.

Verbum: Universal language?

TR: Yes. Music is a method of communication that is much more specific and subtle than any spoken language invented. And music is spoken by people of all languages. That's the reason it has such a great mystique. And so to me, the only reason you make music is as expression, as an expression of yourself. And the new people who are doing it with these machines, you know, are speculating in their minds the whole time, "Well, what is so-and-so going to think when they hear it?" One way to find out is to have them listen to it while you're doing it. Nobody makes music not to be heard.

DL: I think it's okay that people make music with electronics for their own ears, their own enjoyment.

TR:I agree. I don't think there's anything wrong with that. In fact, I think there's a certain validity in communicating with yourself in that sense. And looking at it as a catharsis — an unburdening of your soul in a certain way. And if you're the only one who hears it, and you're satisfied with that, that's fine. Unfortunately there's this whole area of recorded music that is completely in the thrall of technology. You know, artists who are completely enthralled by the technology. Got to have the next box that comes out. They don't write music. They cut and paste together,you know, almost from the first thing that comes out of the box. Turn the box on, "Oh, that's intriguing. Well, let's do that, let's cut that and we'll put this together." It's very playful. It's like being in the sandbox. It's not like being at the negotiating table. This kind of music doesn't have a lot of impact on me. It doesn't please me to hear it.

Verbum: Maybe people still need to outgrow this infatuation with synthesized music, both the listeners and the musicians.

TR: There was a time when it wasn't so bad, because people came first with something they wanted to express and discovered this as a tool that would make some part of it easier. But then when everybody discovered MIDI and the home studio, and all this stuff that you can do yourself, and drum machines, and sample sounds, and this-that-and-the-other-thing, specialists came along — people who specialized in using the boxes. And they had nothing in particular to say. Everything was just a challenge in how to patch the boxes together.

DL: It seems to me that electronic music making and computerized image making are at the same stage. Right now it's very very difficult to sit with a paint program or any tool and make a good piece of art on the computer. It's extremely difficult. It takes something more — more than just having the tools at hand.

Verbum: Some maniacal devotion.

DL: Well, some inspiration, you know. Art has always been the same — inspiration, talent and persistence. And slapping things together, in my mind, has never produced art; only in really exceptional situations. I guess I'm saying the same thing Todd said about the synthesizers. Just because you have a room full of media equipment, it doesn't mean that you're going to produce something that touches someone's heart or soul.

TR: The problem is that touching someone's heart or soul isn't even a priority. The kind of meeting of the minds that happens in ideal musical situations — it's not the priority.

DL: It should be. I mean, if music, in an ensemble situation, becomes something that doesn't exist for the solo performer, it should be the same way when musicians use computers. People hook together -- something that we were just talking about — and something should happen with a group of people adept at using their machines, working together — above and beyond the sum of their parts. I mean, there *have* been successful high tech synthesizer bands, haven't there?

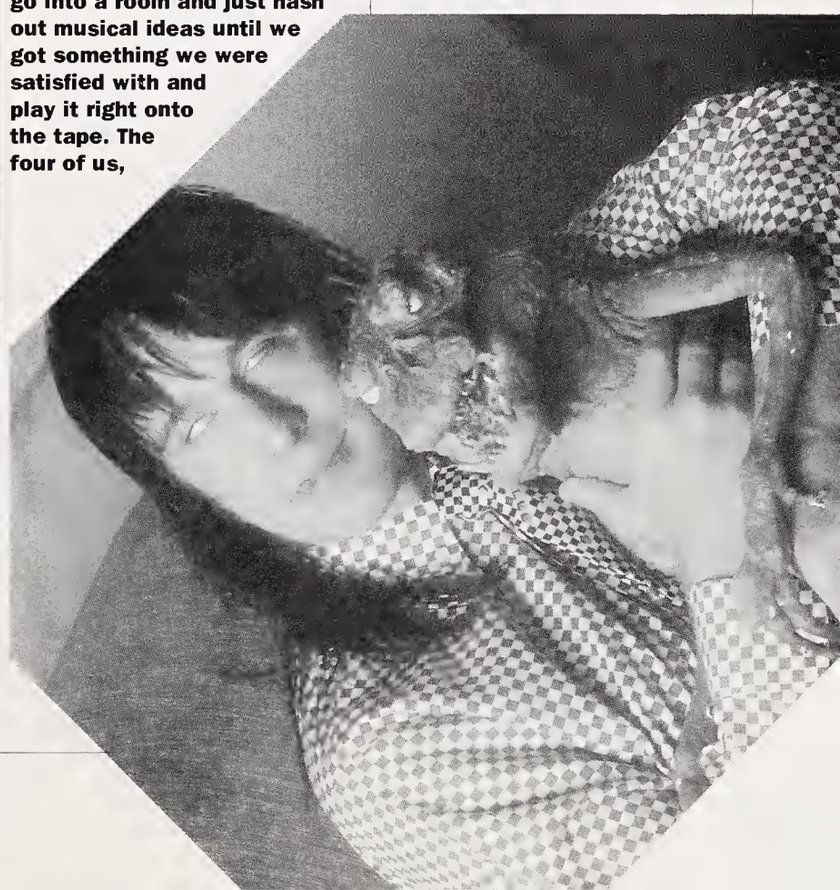
Verbum: Oh, yes. I always thought of Utopia as a high-tech synthesizer band, for example.

TR: Yeah. When the band was first formed, we thought it had a very self-conscious, futuristic nature. We've always had synthesizers involved to a certain degree. But I have to say from personal experience that the one album that we tried to do all-MIDI was the most miserable recording experience of our entire recording career. The technique that we used when we recorded was that the four of us would go into a room and just hash out musical ideas until we got something we were satisfied with and play it right onto the tape. The four of us, in the same room, at the same time. Occasionally we would have to overdub stuff. But the idea was to get as much spontaneity as possible — to play together. That was the idea. That we would create. We could speculate on what we intended to do, but the real objective was to come up with something better than what we could visualize.

Verbum: Let the muse come through you?

TR: Yeah. That's probably why it's difficult to create good art on the computer — Well, there are a couple reasons. One is the fact that if you can change something, you will. And the computer makes it much easier to edit and fix, you know — it's, "Oh, I made a mistake, I'll fix that, or paint it." What it does is to foster this false illusion of perfection — the idea that you could make something perfect. And that is never the object in art. The object in art is expression and communication. Hopefully, there is no such thing as perfect, right? Because that would disqualify most artists from even trying.

Verbum: Well, on the other hand, though, with the proper attitude on the part of the artist using the tool, the computer offers a lot of opportunity for really great synergy. Chance things happen, too, and if you know when to stop and let it be...



TR: I think software has to be consciously written to encourage that. To encourage play as opposed to work.
DL: The computer has to become introspective. It isn't yet. You can't just step up to an instrument, regardless of whether it's a computer or musical instrument or a brush and canvas or anything in the whole world of art, and expect to immediately create something good — beyond child art or the novel piece of accidental work that happens to look interesting. In the long run, there's no substitute for taking your craft into your life and fusing with it to the point where it becomes a transparent medium, and you can express yourself. It has happened so seldom with computers that it's a little discouraging.

"...we want to help people learn how to *play* the computer. Rather than use this for that, or work on the computer. To play it. To view it as being at all times and in every aspect there, a creative instrument." — Todd Rundgren

Verbum: Maybe hypermedia is the beginning of that introspection on the part of the computer. There's an amazing number of artists who really do have kind of a programming sensibility, playing around with HyperCard, doing little bits of animated poetry, with images and words and sounds It's kind of nice to see these new forms of creativity...
DL: It's starting.
TR: That's probably the main thrust of our software venture — we want to help people learn how to *play* the computer. Rather than use this for that, or work on the computer. To play it. To view it as being at all times and in every aspect there, a creative instrument. And to feel that there is no area within the computer realm that they can't acquire the ability to use creatively.
Verbum: I was trying to make a connection between what you're doing now and your original band. You know, naming of the band Utopia, and coming out of the seventies...
TR: Oh, that was acid.
Verbum: I mean I haven't followed your music and lyrics closely *A Wizard a True Star*, but I trust that all of it...
TR: It's all just the same thing. We did it over and over again, rehashed it.
Verbum: Well, I trust that the content of all your music is about consciousness and evolution and positive change.
TR: Most of it, yes. Probably about my third album I stopped writing love songs per se, and just started writing songs about things and what I thought of them — and most of what I was thinking about was nature consciousness and why we do the things we do and think the way we think.
Verbum: What would you have done if you hadn't become a successful musician?
TR: The interesting thing is that if I hadn't become a successful musician, I probably would have become a computer programmer anyway. Because that was one of the two things I was going to do when I left high school. It's just that I got lucky and got into a band where I could make a living, so I didn't have to go back to school and learn how to program computers. Which was probably just as well, because programming computers in those days consisted of rapping wires on a block somewhere.
Verbum: What is it about programmers and music? I seem to run into a lot of programmers who are musicians.
TR: Yeah, it seems that almost all programmers play musical instruments. I imagine both activities require, in some sense the same kind of mind set. And it's composition of a certain kind in both senses.
Verbum: Well, music seems like a right brain process, kind of intuitive, flowing —
TR: But the idea is that you previsualize an effect. You seek to realize or achieve that effect by what is essentially a mathematical process. Music is the most mathematical of the arts. Anybody who can't keep a beat is out of the club. Anybody who doesn't realize that at the bottom level much of music is basically digital, just doesn't understand what's going on. You have to at least be able to tap your foot, to produce an evenly subdivided measure of time, just the same, all the way down. All music is based on this. And all music is based on a limited number of pitches numbered 1 through 12, or A through B. And in a certain sense, there's a special language that you have to learn to understand. It's very much like — *very much like* — programming. I think it's being comfortable with this basic mathematical concept that you find in both programmers and musicians.
Verbum: It's interesting. In some ways writing code and playing the guitar look like opposite extremes. But there's an underlying common ground.
TR: I think it requires a degree of idealism to do both. Well, you have to be an idealist. You have to be able to believe that you can create the effect that you want. And it may be equally difficult in both spheres.
DL: You can stop to analyze it and examine the different forms of music. And you can draw maps of different forms of code writing, too. You know, comparisons have been made between Herman Hesse's glass bead game and computer programming. That is, the common distillation of the way to express all forms of knowledge that we have. Once knowledge is expressed in bits in a machine, it's a common language. When out of the computer program you get the kick, the aesthetic kick of hearing a well bent note or a wail on an instrument, that's when you know that you've arrived with programming. Programming is all ahead of the fact. You sit and you plan. It's like composing: you write the notes down on paper, and then that's the way that it's played. And if it's not subject then to another interpretation, it's that way forever. But program interaction can provide the necessary human element after the programmer is done with his job.
TR: Yeah, we're back to the idea of playing a computer. To skull out a piece of music and to skull out a piece of code, may be very similar processes. But you can improvise music extemporaneously, and it's very difficult now to extemporaneously improvise code. But it would be a wonderful thing if you could. It would be a wonderful thing if you could take the computer capabilities and extemporaneously line them up and connect them together and stack them in ways that are unexpected in order to get results that are unexpected.
DL: It's presented in the media all the time. You see the image — the idealized image of the computer wiz — sits down at an arbitrary machine off the shelf in our day and age, and no matter what the problem, after a little bit of typing on the keyboard, maybe four or five beats in the episode, suddenly a 3D animation will pop up That's the ideal. That's what we're after. And it should be that easy. And if you think about it, what tools is the wiz using? What machine? It's impossible. It's fiction. But only for right now.
Verbum: Well, can you take time to summarize what the two of you are planning with Utopia Software and the Hypercode product.
TR: OK. Hypercode is a component software scheme implemented as an application — in other words, it's intended not to have to be exclusive of the other things that people may have running on their machine. But it's designed specifically to addict them and draw them away from the other things that they use on their machine. They can, if they're so inclined, continue to treat Hypercode as if it was just an application. But it's a component software system — not just extensibility and not a recompilation of various code modules into a new application. This is components in the truest sense, where elements can be added and removed without affecting the overall performance of the system. The purpose is to essentially smooth the continuum between the so-called user and the programmer. To blur that division to the point that it becomes completely moot. In other words, the user, in order to participate in this, is going to have to start taking

Continued on page 40

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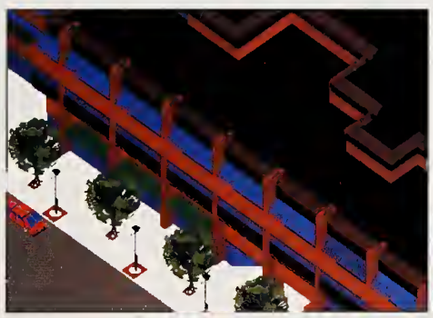

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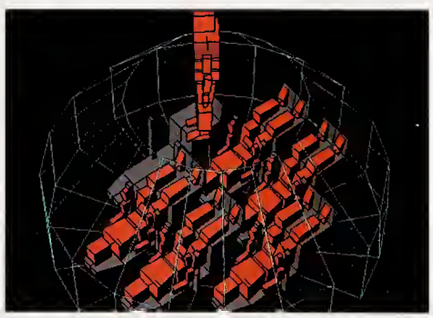

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ANIMATION

"Crystal Catching" by Gregory MacNicol was created on an IBM AT using a Targa graphics board and Crystal 3D software. These frames are from a two-minute animation.

Using Deluxe Paint III on an Amiga 2000, Charlie Unkeless produces short animations for the rock group Oingo Boingo's stage show (above and right). They are projected on a 30-foot screen behind the band during the performance. To create the two shorts shown here, Charlie and creative confederate Jeff Bruette used a Newtek video digitizer to capture images from videotape and photos, modified them with DP's painting tools, and produced the finished animations in the program's animation environment.

THE DEMOCRATIZATION OF COMPUTER GRAPHICS

■ *by Peter Sørensen*

John Whitney, Sr., who is justly known as the Father of Computer Animation because of the pioneering work he did back in the 1950s, coined the phrase "the democratization of computer graphics" several years ago. He knew that computers capable of creating top-quality graphics and animation would eventually become inexpensive enough — and easy enough to use — for the little guy to own and work with. Well, the democratization is finally starting to happen.

You can count on one hand the number of years that have passed since it cost a million-plus dollars to put together a real broadcast-quality computer animation system and support staff. In those days before off-the-shelf software was available, only a handful of animation facilities had the ability to synthesize good 3D images, and they guarded their secrets fiercely. If you wanted to start your own facility, you had to hire a team of people to write

DOWN TO THE DESKTOP

■ *by Gregory MacNicol*

In the past year, a flurry of developmental activity in the domains of the three personal computers systems that are most used for animation — IBM-PC/AT and clones, the Amiga and the Macintosh — has resulted in substantially increased capabilities, enhanced ease of use and improved output. Indeed, in many cases pc's can produce animation comparable to that generated on expensive mainframe systems.

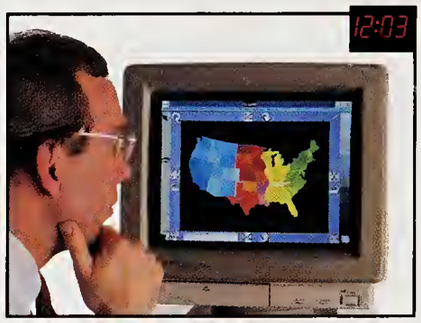
As pc-based animation systems grow in popularity, the marketplace is adjusting to accommodate the needs of the new (and often less technically oriented) animator. The independent animator finally has the tools to do the job. Incredible award-winning animations are now "produced" in spare bedrooms on "home" computers. An excellent example is Steve Segal's brilliant "Dance of the Jumblers," made using an Amiga.

Rendering times are slow when compared with those of the latest super workstations. But other limitations of pc-based systems are now readily remedied. Mass memory has become less costly, and with fast hard disk drives, users can harness hundreds of megabytes at a relatively low cost.

Great. I need to hand out this report by 12:30. I need a cover...a dynamite cover. The art department is completely booked.

Looks like it's me and Clip3D.

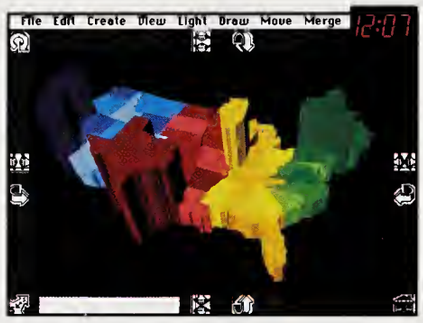
Where's that Clip3D Geography volume?



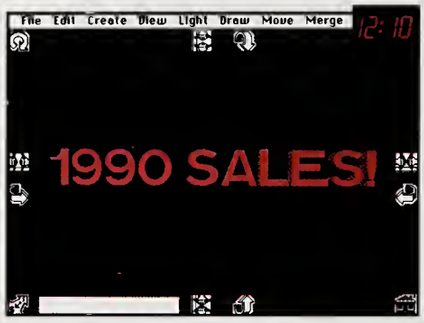
I'll start with a U.S. map: not bad, but it needs some excitement.

Tilt the map back for a little southern exposure...

...turn it to the left...there... that's a good angle.



Let's make the big profit centers POP right out.



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the code (which would probably take a year or two to finish) and buy a roomful of hardware. Now you can get a complete system that out-performs the custom jobs of yesteryear — in both speed and quality — for the price of a nice car (all right, a *very* nice car — 25 to 75 thousand dollars)..

Since today's high end will be tomorrow's desktop system, let's take a quick look at a few of the more unusual features that can currently be found on some of the big animation systems and that will probably arrive on the desktop in the next few years.

Most 3D programs allows you to build your objects out of polygons, while others use *patches* (which you could think of as three-dimensional splines, somewhat like the two-dimensional Bezier curves of PostScript illustration programs). Since each method has different advantages (polys are better for geometric shapes, patches for curvy things) it's really handy — but unusual — to have access to both methods. A capability that is almost unheard of, but which ought to be widely available, is interactive sculpting. The New York Institute of Technology has a sculpting program that allows one to guide a shape such as a sphere through space, sweeping out 3D volumes that become solid. The process can be either additive or subtractive, allowing you to build up material or or carve it away (something like the Boolean operations in Pro3D for Mac and PC).

Jim Henson's "Waldo C. Graphic," seen here in low resolution, talking to Kermit the Frog, is animated in real time by puppeteer Steve Whitmire at Pacific Data Images. The animation is calculated in high-res after Whitmire gets the performance just right.

Instead of making objects out of solid surfaces, some things — such as fire, for example — are better made out of swarms of pixel-sized points of color called *particles*. The still-experimental particle technique has even been used to create beautiful plants and trees algorithmically.

Texture mapping (a poorly named process that really applies flat patterns, rather than textures, to surfaces), bump mapping (which more properly deserves to be called texture mapping), and reflection mapping (a well-named technique for making shiny surfaces appear to mirror their surroundings) are all fairly standard on mid-range systems now. A subtle but useful variation of reflection mapping that you don't often see is reflectance mapping, which allows for the mapped surface to exhibit varying reflectivity, as your car would if you were part way through buffing up a wax job. Since computer imagery is nearly always too damn clean and antiseptic, reflectance mapping can be used to subtly dirty up an object (it's great for fingerprints on glass, for example), adding to your scene's realism on a subliminal level. By the way, a

In short, we're seeing major advances in the management of animation tasks. Networking, storage and enhanced output are all part of the emerging picture. So let's take a look at who's doing what in the various domains of the personal computer.

THE AMIGA DOMAIN

Amigas are the least expensive pc's that are directly compatible with video. They're also easy to use. As a direct result, we're seeing the products of this computer featured in Coke and Disney ads as well as TV series such as *Max Headroom*, *Amazing Stories* and *TV 101*. The Amiga is limited in color (compared to IBM-PC/AT and Mac systems), but fewer colors means reduced memory requirements, which translates directly into faster calculations and reduced digital storage requirements for the images.

To bypass the expense of single-frame video recording equipment, many users store their animated frames in memory for real time playback. In other words, Amiga users can store sequential images in memory, play them back in real time at the standard 30 frames per second and most importantly, record the production directly onto videotape.

Clearly, the Amiga has come of age and can no longer be dismissed as a high-quality toy (or low-quality computer). At Ohio State University, home of some the more impressive achievements in computer graphics, Amigas are networked, via Ethernet, to powerful Sun workstations. Students use Sculpt 4D (from Byte-by-Byte) for model making and motion scripting. When the initial processing is complete, their data is sent to a minicomputer for mass storage and rendering.

Actually, there are two networks at Ohio State; one is set up for general student use, and the other is dedicated to special applications such as experiments in ray tracing. The Amigas mesh smoothly in a networked environment. Networked capabilities are accessible via the Amiga's windowing and multitasking features: Ohio State students simply open a window to the Sun and log on.

A lot of the credit for the popularity of the Amiga systems must go to the software that has made Amigas increasingly attractive as teaching/learning tools. Aware of the success of the Ohio State scheme, the art department at Rutgers has set up a similar system. Using Amiga pc's, Rutgers students can create animated sequences of solid models in 3D and then record them remotely onto 3/4-inch videotape.

Still, the Amiga has limitations. With a maximum resolution of 640 X 400 and 16-64 displayable colors, neither full-color capability nor anti-aliasing is possible. Anti-aliasing is an especially important feature in animation production because the jagged diagonal lines can "scintillate" noticeably when rotated or scaled. Yet, due to this same limitation, less video memory is used and animations can often be viewed and recorded in real time, because it takes less time to calculate images.

The net result is that the Amiga continues to be a favorite of video artists. Wildly creative videos are regularly produced on this low-cost system.

THE IBM DOMAIN

Perhaps the most impressive developments in low-cost computer animation have taken place in the IBM-PC/AT world. The 286 and 386 pc's are relatively inexpensive (AT clones can be had for under $1000). What's more, they're versatile and easy to upgrade. In fact, with the latest 25 mHz 386 machines equipped with fast hard disk drives, the unit is faster than high-powered expensive workstations were a year ago. And much of the software now is taking advantage of the fact that PCs are expandable, with large memory boards, for example.

And in the software arena, the more advanced programs are being fine-tuned to the capabilities of the hardware. Programs can now be setup to take advantage of the large resident memory boards and many programs can be configured to use

good software package should provide a sizable "library" of ready-made surface properties, so you won't have to waste time figuring out how to simulate gold and other frequently used materials (look for this feature in the new PhotoFinish for both the Mac and the PC).

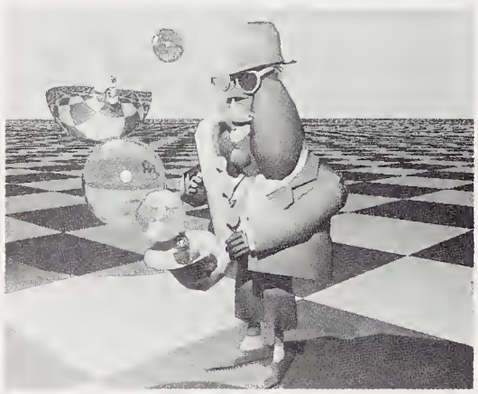
Now that some computers are getting fast enough to render solid objects of moderate complexity in real time (1/30 of a second), a couple of companies are abandoning the traditional key-frame method of specifying motion, and turning to an approach that's more like puppetry. With this method, motion data is recorded while a move is performed in real time using three-axis joysticks. Two or more puppeteers may work simultaneously on complex performances, one controlling a character's body while another controls the face, for instance. Or one person can do it all in a series of passes, adding a new channel of motion with each pass. If a slip occurs on the first take, the flaw can be corrected on a second take while everything that was good about the first is retained.

Motion is also generated algorithmically at some facilities. Programs that can detect when one object touches another can keep a car's wheels on the road as it moves over bumps, and one extraordinary artificial intelligence system controls the motion of individual birds flying together in a flock (the animator just has to indicate where the flock is to fly).

Cast shadows do a lot to make an object look like it's really there in the scene, but most rendering processes other than ray tracing (which is very time-consuming) don't calculate cast shadows automatically. Even ray tracing portrays shadows with unrealistic hard edges. But new radiosity techniques now render them with soft edges that increasingly feather out shadows the farther they fall. Related techniques also can be used to impart reflected color from one neighboring matte-surfaced object to another. And it's now possible to portray natural-looking light beams streaking through air.

"Sun Shade," a 3D rendering by Nelson Max, shows trees casting soft shadows with light rays streaking through the branches to the ground.

Nearly all computer animation suffers from jittery motion since the individual frames are rendered as still pictures without the blur that softens motion in live



This frame is from an animation created with Sculpt Animate 4D on the Macintosh II. Byte-by-Byte developed Sculpt-Animate on the Amiga platform and is releasing the Mac II version this year.

the hard disk for virtual memory. This is especially helpful for manipulating animated images that may use many texture maps in order to put 2D pictures on 3D surfaces. The memory is also useful in generating reflection maps that make objects shiny, and in shadow generation.

One company taking advantage of the underused capabilities of the 286 and 386 systems is Crystal Graphics, developers of the software products marketed as TOPAS and Lumena by Graphic Software Labs and Time Arts respectively. These products have boosted the size of available texture buffers, increased model and polygon sizes and added smoothly shaped spline-based models (in contrast to straight-line-polygon-based models).

Spline-based models allow more fluid animations. A cylinder, for example, can be made to bend, twist and taper smoothly. The newest versions of these programs also offer improved speed, the ability to create specific highlights on the surface of objects, a starlight filter for star-patterned highlights and finally, true metallic shading.

Pansophic's StudioWorks is a unique product marketed as a complete graphics system and aimed at what the company calls a "full-service art department." The software is designed to produce resolution independent images, in addition to video. These images can later be integrated and shared to produce high-resolution slides or videos.

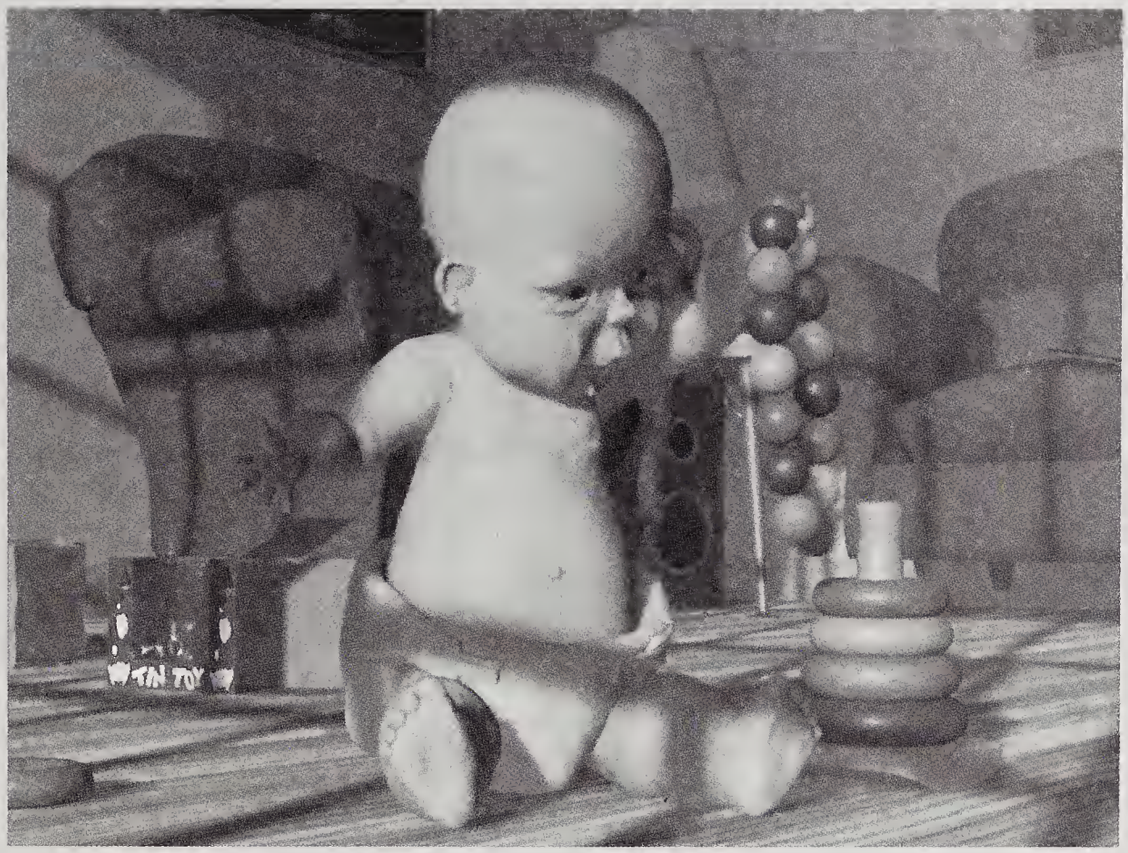
One of the more novel attributes of StudioWorks is a feature the company calls "Metamorphosis." A final object may be composed of percentages of other objects and transformed, through animation, into a new composite object.

One of the early developers of IBM-PC based animation systems, Cubicomp, has added a feature to their AutoPaint software that probably represents a trend. Animators sometimes want to superimpose an effect over video but can't afford to paint and change each frame. AutoPaint enables the user to apply a user selected-effect to a video, frame-by-frame. This powerful capability can add life to a somewhat lackluster video or even "repair" a botched one. Some of the available effects are water coloring, an oil paint look, colored pencils, pastels, ink and a lithograph effect.

Digital Arts. another high-end animation system, has also been listening to their installed base of users. According to Sheldon Liebman, president of Digital Arts, most of the users of their software are in the industrial and manufacturing market and include giants such as TRW, Grumman and Lockheed.

The Digital Arts software incorporates many excellent features such as their RenderMan interface. The software offers spline-based models in addition to polygons, hierarchical motion control and excellent lighting control throughout. Complex functions that tax the PC/AT's computational capabilities can be handled via an accelerator board that boosts performance by three to five times.

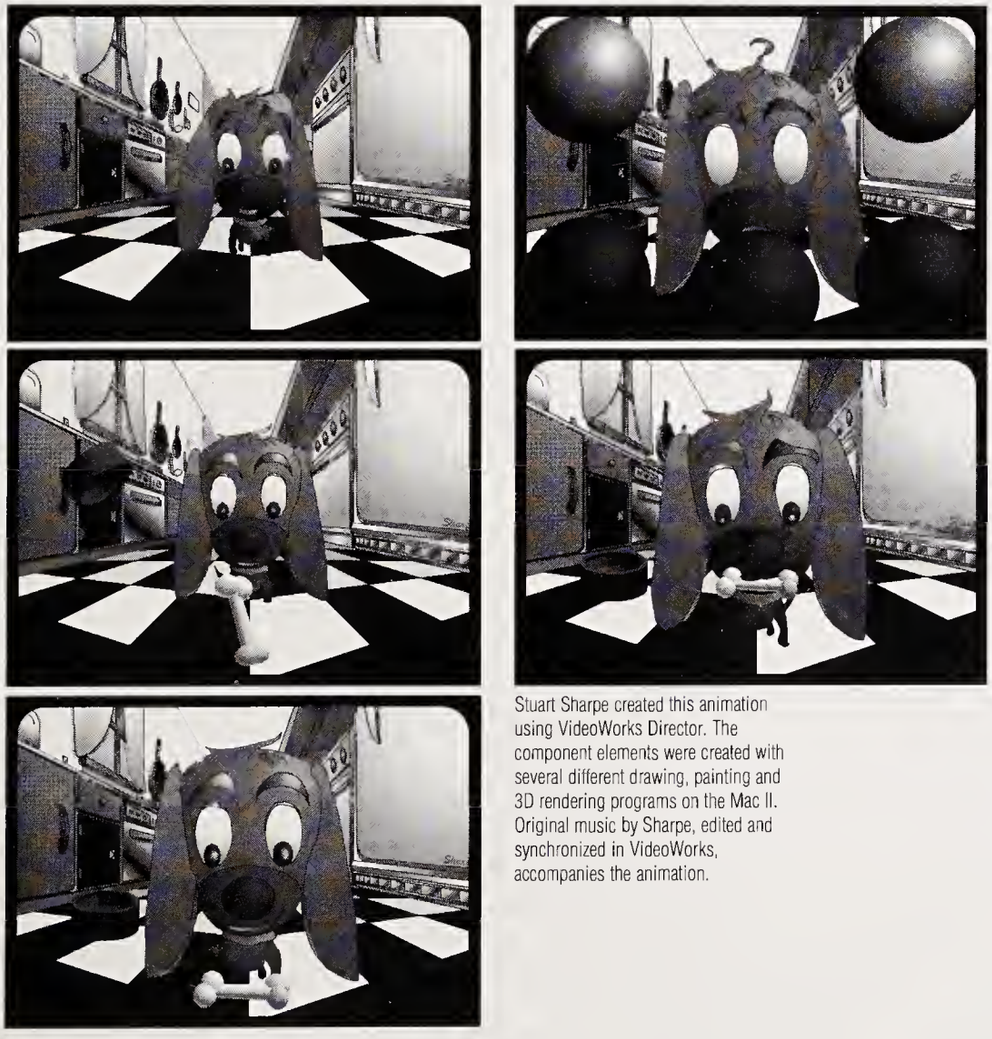
Digital Arts software in offering bump mapping, a capability that extrapolates the shape of a 3D object from the qualities of a 2D picture. Thus, a mountain landscape or water scene can be produced based on a a 2-D image and made to look as if it incorporated a third dimension. Also unique is the



"Tin Toy" (which won an Academy Award this year) shows soft shadows cast by a window. And if you look closely you can see motion blur exhibited at the end of the string of beads. (© 1988, Pixar)

filming. Calculating blur is very calculation-intensive, but the ever-increasing power of microprocessors will eventually make the jitters as obsolete as the jaggies.

Today's better desktop animation systems already feature such advanced capabilities as quadratic patches, fractals and ray tracing. Tomorrow's systems will undoubtedly acquire the advanced techniques we've touched on here — if any of the techniques sound like something you'd like to have, be sure to write to the software developers and encourage them to work on it. The golden age of graphics democracy is dawning! ♦



Stuart Sharpe created this animation using VideoWorks Director. The component elements were created with several different drawing, painting and 3D rendering programs on the Mac II. Original music by Sharpe, edited and synchronized in VideoWorks, accompanies the animation.

software's ability to connect objects to each other in such a way that they flex like a rubber band.

Autodesk, makers of the popular CAD program AutoCad, seems an unlikely source for a 2D animation product. But the quality and power of AutoAnimator make it on par with their other products. Relying on the PC/AT's VGA graphics mode, this software can accept images from a myriad of sources including Atari, Amiga other IBM paint systems and MCI picture formats. But what makes the product unique is that you can manipulate a sequence of images by twisting and flying them around like a canvas being tossed in the air. The program will also metamorphose an image into another object — a daisy can be turned into a house, for example.

Perhaps the best feature of AutoAnimator is its speed. The animation rate is limited by the VGA board. Because the VGA board's resolution is 320 X 200 and the color is limited to 256 colors out of a quarter million, little memory needs to be accessed. The result is that frames fly by even faster than video rates and far faster than you can see. Many VGA boards are video-compatible, which means you can videotape exactly what you see on the screen. So with AutoAnimator you have excellent control of the animation rate. The AutoCad animation Player, which is in the public domain,

can show a (very impressive) maximum of 4000 images in an animation. The power and ease of use of 2D combined with a less-than-$300 price range make it a powerful animation tool.

THE MACINTOSH DOMAIN

Compared to the wealth of hardware and software developments in the Amiga and IBM-PC/AT domains, the Macintosh (specifically the Mac II) world has been relatively quiet. Although, as of this writing, several companies are in the development stages of promised 3D animation products, there are still only a few full 3D animation systems available for Mac users.

One product that's is already on the market and is getting extensive commercial use is The Presenter from Visual Information Development. This package can take Mac files, such as those produced by MacDraw and SuperPaint and use them to create complex 3D animated sequences.

The Presenter provides an easy-to-use interface to popular CAD packages and offers a full range of capabilities, such as 1024 light sources as well as smooth and linear interpolation of movement. The Presenter interfaces fluently with VID's Render Dimensions and Ray Tracer Dimensions as well as with other standard Mac formats (DXF and PICT, for example) for creating complete animations. The New York advertising giant (and Apple's PR firm) BBDO has been using it already for excellent product renderings and animated product and marketing films.

One of the most popular 3D animation products for the Amiga, Sculpt 4D from Byte-By-Byte, has now been ported to the Mac II. It enhances the Mac's user interface for modeling and motion scripting. Sculpt 4D's speed has also been ported to the Mac. When each model is displayed, internal memory records the actions and model arrays. The net result is fast display of real-time animations and updates of the model. The program lets you create shadows just by clicking on Shadow mode. At the moment, Sculpt 4D works only as a real-time video presentation tool, but it will have still-frame video interfacing soon.

In developing their Director package, MacroMind, originators of the popular VideoWorks II, has taken advantage of the Mac II's memory and speed. (This program also works with the Plus and SE.) Director is intended for multimedia presentations and thus includes sound-production capabilities. While the program is not a 3D renderer with single-frame video capability, it does provide a significant advantage to a new user — it's easy to use. The target use for a product like this is presentations that don't single-frame video animation. A typical use is corporate demonstrations that run directly on the Mac.

Director accepts images created by many resources (for example. captured video, hand drawn images, documents and other 3-D packages). Some users create high-quality 3D rendered images in Swivel 3D or Pro3D and integrate it into text. Once in the system, these images can be edited and combined to form an animated sequence. An additional feature of the Director software is that it offers a HyperCard driver that allows the user to animate directly on top of HyperCard or even within a window.

Director is definitely a product that represents the migration of power from the mainframe down to the pc level. One of the programmers of the new product was a key software developer at Cranston-Csuri, one of the computer animation giants of the past. The software uses an impressive array of features including multiple light sources, texture mapping and many sophisticated functions taken directly from the mainframe world.

Also intended for direct presentation is Showcase F/X from Aegis's Animation Workshop. It allows customization of text and graphics and plays back sequences of images. One especially fine feature is that it produces "ADO-like" effects, which are much like optical manipulations of the 2D images.

CHANGING TIMES

The uses of the pc in animation production are changing. Perhaps the most remarkable trend is the marriage of animation and video. Indeed, because the end result of most animation is now video, the pc has become a standard adjunct to the video animation process.

However, the video interface problem can be a major bottleneck to producing low-cost animation. To assure adequate quality, the animator must have access not only to a costly videotape recorder, (which is designed to record single frames sequentially) but also to video controllers and other expensive components.

Fortunately, a solution to this problem is emerging. Service bureaus, often video postproduction facilities, are providing the service of video transfer. These facilities have all the equipment necessary to work either from the animator's finished digital images (on an optical disk) or from an animation script.

Another impressive trend is the use of pc's as components in larger systems. Microcomputers are increasingly being used as editor/controllers for videotape recorders, as 2D manipulators and as video special-effects units. Seen mostly on MacII–based systems, they allow the editor to see exactly what is being edited, not just time code numbers.

Still another trend worthy of note. is the use of pc-based computer animation systems with access to inexpensive video formats (8mm, for example).

With all the complexity it adds to the selection process, pc animation makes animation tools available to a much broader range of artists than we could have imagined a few years ago. And, in the right hands, pc animation can be made to produce stunning creative work. ♦

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Gregory MacNicol is a computer graphics consultant, animator and high-tech writer. He lives in Santa Cruz, California within walking distance of the beach.

Contacts for "Animation"

Ethernet
Ameristar Technologies, Inc.
470 Whittier Avenue
Medford, NY 11763
516-698-0834
$899

Sculpt 4D
Byte-by-Byte
9442 Capital of Texas Hwy N.
#150
Austin, TX 78759
512-343-4357
$499.95

TOPAS
Graphic Software Labs
10291 N. Meridian #275
Indianapolis, IN 46290
317-844-4364
$5000 ($7000 more for additional components)

Lumena
Time Arts, Inc.
3436 Mendocino Avenue
Santa Rosa, CA 95403
707-576-7722
$2500 (base price)

AutoPaint
Cubicomp
21325 Cabot Boulevard
Hayward, CA 94545
415-887-1300
$7800

Digital Arts
Digital Arts
7050 Convoy Court
San Diego, CA 92111
619-541-2055
$9995

AutoCad
Autodesk Inc.
2320 Marinship Way
Sausalito, CA 94965
415-332-2344
$3000

SuperPaint
Silicon Beach Software
9770 Carroll Center Rd., Suite J
San Diego, CA 92126
619-695-6956
$199

The Presenter
Visual Information Development
16309 Double Grove
La Puente, CA 91744
818-918-8834
$595

Ray Tracer Dimensions
Visual Information Development
$995

Render Dimension
Visual Information Development
$995

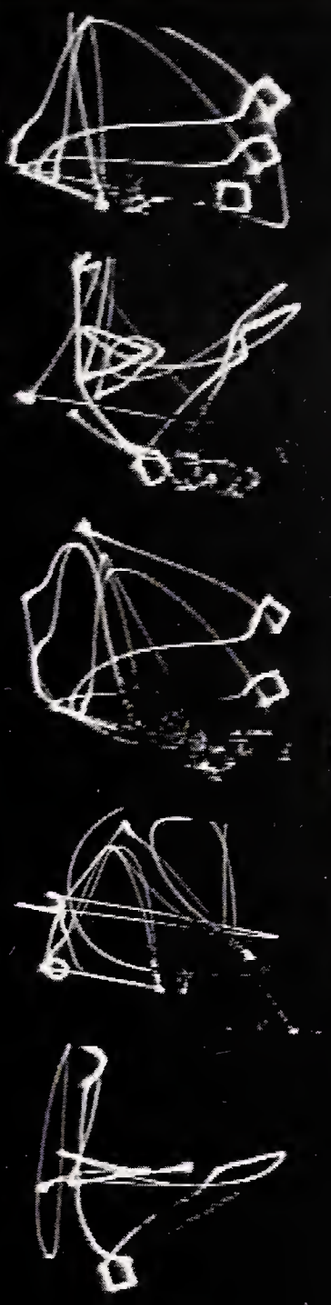
MacDrawII
Claris Corporation
440 Clyde Avenue
Mountain View, CA 94043
415-962-8946
$395

Pro3D
Enabling Technologies
600 S. Dearborn Street, #1304
Chicago, IL 60605
312-427-0386
$495

PhotoFinish
Enabling Technologies
$1995

COSMIC JAM

■ *by Nicholas G. Mac Connell*



Mirror-directed beams project from a laser device (lower right) controlled by a keyboard and MIDI interface to create moving light sculptures (above).

Have you ever dreamed of owning a magical lightwand? Maybe some kind of keyboard instrument that could transform musical notes and chords into paintings made of light beams.

Imagine a three-dimensional kinetic sculpture, or perhaps even an animation of images, that you could make appear or disappear to music. With the very touch of your fingertips you could paint music.

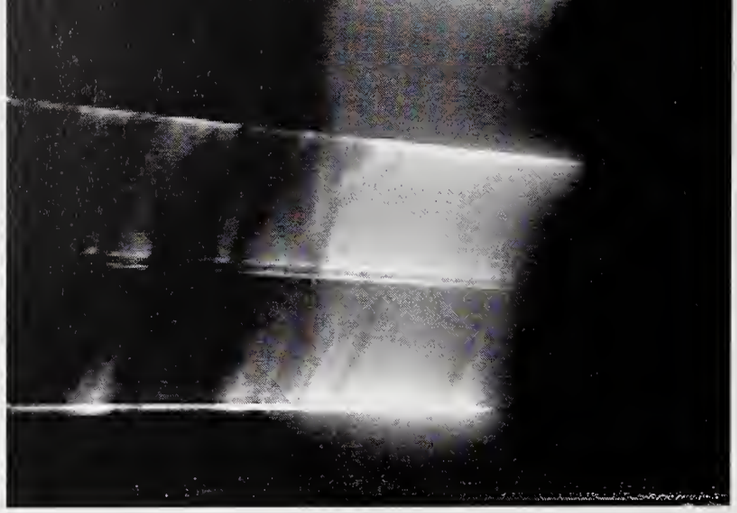
Now imagine further that your magical lightwand is connected to a high-powered laser light source — a spray-paint gun that could spray light instead of paint. The light would be so powerful and bright that you as musician-artist, could literally illuminate the entire sky for miles and miles out with your compositions.

ETHEREAL FOG

Clouds could make a vast reflective canvas for laser-art compositions and animations. But if the right kind of fog happened to roll in, your art and musical works could turn into huge, spectacular, moving three-dimensional sculptures. Just imagine making the kinetic laser sculptures appear and move to your music, an ethereal display as you step into the fourth dimension of moving visual music.

STEPPING INTO THE EXPERIENCE

It's pitch dark, and you step out into your night studio, an industrial parking lot in a semirural neighborhood, with



The combination of 35-watt laser beams and fog creates a waterfall of light.

your keyboard-lightwand instrument supported by a strap around your neck. You're connected by a long thin cable to a garage full of music synthesizers, which in turn are connected to a computer that controls a giant, water-cooled argon laser powered by a special diesel engine generator humming away on the other side of the building.

You decide to play a sustained major seventh chord on the keyboard, and before your eyes a three-dimensional sculpture of beams blasts out into the sky as far a you can see. Your brain experiences a new kind of sensation: As you look at the sound streaming forth into space, your ears can't quite believe what they're seeing.

Your heart is pounding, and your mind anticipates more, so you decide to try some special effects. You reach for the pitch wheel controller, and the whole sculpture instantly starts bending around in circular motion. How about a quarter-turn bend up and then a full swing down? The images are moving instantly to your musical commands.

If you groove out a really nice light sculpture, just hold your index finger on the sustain button and your laser lightwand will freeze the whole chord image. Now you can lay in some high solo notes to bring out the fine details of your art piece. But wait — you haven't tried the ribbon controller yet. While your third finger is starting to slide across the ribbon, you see the notes of your solo twinkling and bending light beams like fireworks throughout your sculpture.

With a long enough cord connected to your keyboard lightwand, you can take a walk around your work and check it out from new perspectives. Or stand in the center of the laser light waterfalls flowing down the fog from the chords and notes of your compositions.

At this point you look out into your parking lot studio to find a whole crowd of people spontaneously gathered from the surrounding countryside.

THE ROAD TO THE PARKING LOT

It all happened on April 8, 1989. I was there, and if you weren't, I'm sorry you missed it.

I've spent an exhilarating part of my life working with music, computers and art. Ever since the research projects I conducted at the Electrical Engineering Department of the University of Florida in 1973, I've been fascinated by the idea of creating art images with lasers and music. Finally, something called MIDI emerged out of the gardens of electronic music, and that was the first step in making it all possible.

MIDI stands for musical instrument digital interface. It's a language in which electronic musical instruments can talk to each other, and more important, to computers. This means that a musician can send MIDI language to a computer by playing an instrument.

There are computer-controlled laser art devices around, too. So why not have the computer contol a laser to music. The missing link in music-controlled lasers was a MIDI laser interface. But rumor had it that two wizards, Randy Johnson and Adam Harris, had a company called Laser Entertainment Systems and were building the missing MIDI laser-controller link. So I looked them up.

Randy and Adam had just about finished designing and building their system. So we planned an experimental meeting April 8. Before the meeting I wrote a jazz fusion piece in which I could send MIDI note sequences to the powerful 35-watt laser system. I envisioned images triggered by the preprogrammed drum beats, with my improvised chords and solo kind of bending laser light all over the sky.

But to get to the sky, we had to take the first step on the desktop. Adam sat in front of his Amiga computer, running the software he had designed, and asking me where I wanted the beams or images to appear relative to an *x,y* graph on the screen. Pull-down menus of predefined objects like stars, triangles and squares allowed us to easily assign exactly what symbol each key note would make the laser display. Each MIDI keyboard function could be assigned to a different laser effect.

For example, the pitch wheel would control the rotation of an object, key velocity would make a beam go farther or in another direction. Pitch modulation would control light amplitude, and sustain would hold the image on. The program change buttons could be used to change key assignments for the whole keyboard.

Once we got all the assignments made, I prerecorded the drums, leaving the solos to be improvised during the live performance with the beams.

THE ROLE OF MIDI

It was MIDI that first brought computer technology to the hands of musicians. MIDI has, among other things, allowed a cross-pollination of different musical disciplines. For example, a guitarist can connect a MIDI device to the guitar and by playing in that familiar medium can generate the sound of flute or horn or bowed strings — just about any instrument sound you can imagine. So now the guitarist can explore what his or her world sounds like expressed through an instrument he or she has never played before. By using a MIDI sequencer, the guitarist can compose, record and play back multiple tracks of all kinds of instruments, including the rhythm of drums.

Because MIDI attachments are becoming available for many instruments and have become a standard feature of almost all electronic music synthesizers and samplers, MIDI has become a bridging network among different musical disciplines.

But could MIDI provide a way for artists other than musicians to perform on musicial instruments? The answer, of course, is yes. (Did you doubt it?)

MIDI DANCING

Now imagine being a dancer. You've spent your life listening intently to music and disciplining your body to move with great precision and grace to the spirit of a musical composition.

You finish your daily warm-up and strap a special belt aound your waist with a little box connected to it. Then you strap another little box around your arm. You swing your arm to a certain position, and out comes a chord of music from a synthesizer located across the room. You continue to move, and you're actually creating music, precisely controlling music as

your body changes position in the dance movements. Your heart is pounding as you try to imagine what your next move — and the next and the next — will sound like.

In an article called "Audible Motion" in the March 1989 issue of *MacUser* magazine, Russell Ito described an electronic device called a MidiDancer, a device that lets the body movements of a dancer create and control musical instruments or compositions. Dance motion becomes music, and dancers become musicians. Their bodies become musical instruments that they play by dancing. Choreographers become musical composers.

It's just one more step, you realize, to hook up a MIDI dancer to a MIDI laser controller. Could a dancer fill the sky with huge, moving light sculptures and perform music to the very movements of the dance? You bet. And the dancer's brain will experience a new kind of sensation: As she casts pirouettes and jetés streaming forth into space, her ears won't quite be able to believe what her limbs are seeing.

As this issue of *Verbum* went to press, the June issue of *Keyboard* magazine arrived, with an article called "Biomuse in Search of the Brain-to-MIDI Link." Benjamin Knapp and Hugh Lusted at Stanford University have been working on a device called a Biomuse that converts biological signals (from one's body) into MIDI signals. Just imagine the live performances you'll be able to generate with direct links between your brain and a musical instrument and a laser controller.

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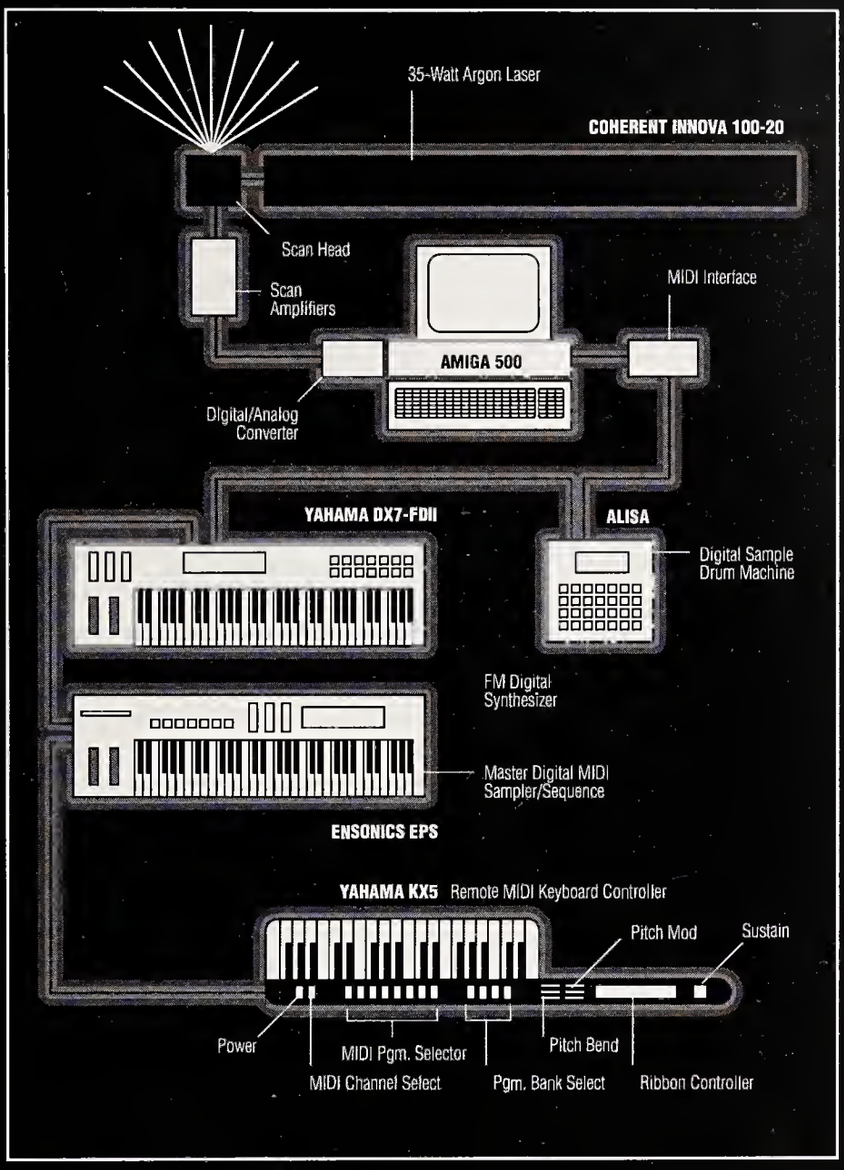
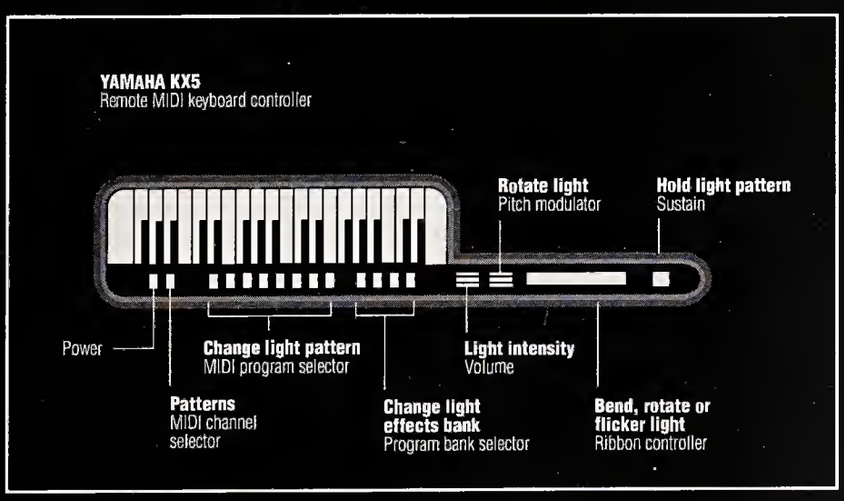
MIDI LIGHTNING





HOW THE MIDI SYSTEM WORKS
When a single note is struck on the keyboard, MIDI data is generated from the key and sent down the MIDI cable and through a MIDI interface box connected to the Amiga computer. The software program running on the Amiga then sends information out through a digital-to-analog converter, then to the scan amplifier, and finally to the laser scan head. The scan head is the heart of what controls the laser images and projections. It consists of a group of very precisely placed mirrors, each of which is controlled by a tiny motor called a galvanometer. The galvanometer can instantly move the mirror to any *x,y* position specified by the computer.

HOW THE LASER DRAWS
The laser beam is reflected directly into the mirrors, and as the mirrors move, the beam moves. The computer program is designed to remember tables of data representing *x* and *y* positions. By establishing a sequence of positions that form a shape and telling the computer to repeat this sequence very quickly, the galvanometers can make the laser light continuously draw a box, a triangle, a star — any predefined shape or image. If the laser beam is projected onto a wall or into clouds or fog, you see a square or triangle or star-shaped light because the beam changes position, tracing out the shape with a motion faster than your eye can detect. The laser can also draw alphabetic characters and fairly complex pictures, so you could write your name or draw your logo in the sky. The computer can even store a sequence of drawings and then repeat the whole sequence to create an animation.

HOW THE MIDI DANCER WORKS
Two little boxes designed to be strapped to the waist and arm act as position sensors that transmit body movements to a receiver. The receiver sends the movement data to a Macintosh computer program called the "Interactor." The Interactor software translates the movement data into a musical composition that can then be performed by any MIDI music synthesizer. The dancer/composer can assign body movements to specific musical instrument sounds or sequences.

We are free when our actions emanate from our total personality, when they express it, when they resemble it in the indefinable way a work of art sometimes does the artist.

— *Henri Bergson,* Time and Free Will

When all you have is a hammer, every problem looks like a nail.

— *Anonymous Folk Wisdom*

I was sitting at my cluttered dining- room table looking for a way to lever together a great deal of disparate information I had gathered for this article — notes from telephone interviews, book passages marked with stick-on notes, photocopied articles, bits of letters and proposals already written and resident on my hard disk, illustrations from trade journals and my own peculiar doodles. I was also wondering how to introduce to an audience of wildly diverse backgrounds and interests the quest for multimedia-capable interfaces, as well as their historical and commercial inevitability. It was, as they say, in front of me all the time.

Now, being able to easily and seamlessly combine many types of source material will not solve all the world's problems, but it's a nice first step. You can, if you wish, do what I did: that is, take everything and laboriously transcribe it into a computer. Much of the technology to input source material directly to computer memory — obviously a superior solution — is also commercially available: optical scanners can be used to input graphics and printed material, electronic mail can be used to move computer-generated musings (one's own as well as those of others) from place to place, and CDs can be used to store and recall video images. There are still some notable gaps (voice-recognition transcription, for instance, may be a long way off), but the most obvious need is for tools and materials — data and applications — to be brought together in a simple and intuitive way, so artists and knowledge-workers can manipulate both the tools and the materials at will, creating with them anything they desire. Where computer graphics and storage begins to overlap advancing video technology, and broadcasting technologies such as fiber optics and satellites are added to transparent interfaces and distributed hypermedia networks, both local and wide-flung, we begin to come closer to a new field that blends science and art into a kind of functional telepathy. Telemorphosis, such a craft might be called — "dreaming over distance."

"The interface between the user and the computer may be the last frontier in computer design."

— *James Foley, writing in* Scientific American, *October 1987*

The problem of writing an article may not sound like art to artists, and it may not sound like important data manipulation to data manipulators, but it showcases the problem of the interface. Whatever the task, I don't just need to input and store data; rather, I need to play with it. I want to arrange and rearrange it in an enjoyable setting, with tools that don't limit or direct my creativity.

The fact that the microprocessing world spends so much time discussing "the search for a new interface" is evidence of how much the computer interface still limits our perceptions and our powers. In the countless other areas where we experience interfaces, we are seldom even aware of them. This does not mean that these other interfaces are perfect; rather, as in the index and table of contents of a book, they may simply be so familiar that we no longer notice them. Computers, however, whether used in business or art or science, are very obviously built for the manipulation of information, and so we see clearly that how we perceive and arrange such information may be the critical factor in how useful to us it is.

Dreaming at a Distance

"I belive that ultimately the interface will vanish, and the input side of the computer will merge with the rest of the environment," says Myron Krueger, computer artist, scientist and president of a corporation named after the term he introduced in his book, *Artificial Reality*. Krueger thinks that the current state of interface affairs is limiting to both human user and computer. The users, forced to learn unfamiliar languages and nonintuitive response patterns, are limited.

THE FUTURE OF TELEMORPHIC

■ *by Tad Williams*

FURTHER REACHES OF HYPERMEDIA

Conversely, Krueger says, the famed man-machine dialog "is, in reality, about as much of a dialog as a hammer has with a nail" — a totally one-sided exchange. That will change, he says, when a machine, instead of merely receiving input, begins to have "a perception of the user."

The thought of computers "perceiving" their users is a challenging one, perhaps even frightening to some computophobes, but it leads directly to what seems the dominant thinking on this issue: In the end, the interface must wither away completely so we can get on with the real work that computers make possible.

Someone jotting a note with a pencil does not usually think about the process itself — namely, leaving smears of graphite on a sheet of flattened wood pulp. Instead, the note-jotter considers what information that piece of writing is meant to convey. In the same way, computer users anticipating the telemorphic future generally do not want to have to deal with such mundane representations as wastebaskets and file folders. "Let's move past the desk-top," says Mike Backes, computer consultant and screenwriter. "I want to assemble my own applications." Backes, who for a long time was a self-described "lone voice in the wilderness" advocating the use of Apple's Macintosh in the motion picture industry, hastens to explain that he is not criticizing the idea of the graphic, user-oriented Macintosh interface. "The desktop held up well until just this year, and I do want some kind of interface."

Myron Krueger postulates an interface that would be indistinguishable from its environment. He is not alone. Experts suggest that personal computers of the future might hide in the walls of home or office and take commands from your voice and gestures, making it possible for you to apply the power of today's mainframes or even supercomputers with the merest word or flick of the fingers. Stuart Greene, one of the pioneers of hypermedia and currently with Apple Computer, Inc., proposes a "Holoverse" — a live-walls multimedia environment where group meetings could thrive, where interactions would take place "around the group's whole universe of shared information, commitments, and promises." Using such processes as object-oriented hypermedia and toolkits for knowledge representation (the same kind of toolkits I need to effectively play around with the components of this article, or to compose and edit a multimedia performance piece or create a work of graphic art), Greene foresees a setting where decisions could be made after considering a variety of different and easily accessible source materials, including "methodware," his term for wide-ranging expert systems that would bring the best of human knowledge to bear on problem-solving. Once such an environment existed, results would not be the only subject of scrutiny; the decision paths themselves could also be fully examined, thus illuminating the process and allowing more microtuning of idea work.

Between the idea And the reality . . . Falls the Shadow.

— T.S. Eliot

The coming telemorphic future is as simple and compelling as a dream of magical powers; at the same time, it is a minefield of technical, political, and cultural difficulties. A Holoversal meeting room will keep track of every path that a discussion takes — but do those whose temporary positions are ultimately proved wrong want to have an inarguable record of their mistakes kept for posterity? Do we want to open the Pandora's Box of *would haves* and *should haves* that a record of all the steps of important decision-making processes might engender? Would we be happier as a nation if we knew what went on during every moment of the Constitutional Convention and were aware of every squabble or mutual back-scratching, or is it better that we accept the document itself in its final form and then try to interpret it with no other accompanying text? A humankind so scrupulously monitored in its decision-making will have to walk a thin line between an unwillingness to take stands and total recursive self-obsession, but perhaps such technology will force us into greater honesty as both creators and citizens.

Many of those who foresee a transparent multimedia interface also foresee access to global knowledgebases which will contain both current information — the latest stock market figures or visual images of fast-breaking news — and archival material, such as global libraries of sight, sound, and text. To effectively maintain and broadcast such huge funds of information could require piggybacking computer technology onto existing broadcast television technology, simultaneously providing an immense source of material for multimedia creations while almost infinitely expanding the sources of entertainment and instruction from which television viewers could select. Experts suggest that to marry these technologies will require a major commitment from American computer companies — as well as a powerful political campaign to prevent the overly hasty institutionalization of HDTV (High Definition TV), which could lock the nation prematurely into standards that might inhibit the full flowering of the telemorphic future.

The much-trumpeted advent of HDTV — televisions with some computing power built in — is seen by many American multimedia futurists as a kind of Trojan Horse that will enable Japanese manufacturing to finally obtain a toehold in the U.S. home computer market. They cite American computer manufacturers' woefully slow comprehension and response to this threat as cause for worry. "The Japanese are driven by consumer needs," says Myron Krueger, suggesting that America's various Silicon Valleys have gotten lazy with success. "Consumers are a very demanding market — they want products that are small and convenient." Krueger is excited about the future, but also offers a word of warning for those who think that the United States will dictate the destiny of multimedia. "A country that doesn't build its own TVs can't defend itself," he says.

The World Next Door

There has been talk for years about the future of multimedia, but the actuality delivered usually fell far short of expectations — cruelly slow laserdisk video games, interactive computer fiction whose limited interactivity was its only point of interest, and so on. The interface has been a similar subject of countless excited claims which in reality turned out to be more variations on the same themes: menus, windows, desktops.

Now, however, there is a different feeling, not only in computer corporation boardrooms, but in research laboratories and studios where graphic art and music and video are produced as well.

"The ultimate objective of artificial-reality is to develop a simulated environment that seems as 'real' as the reality it depicts," James Foley wrote a year and a half ago in *Scientific American*. "The profoundest strength of the interfaces, however, may lie in their ability to go beyond reality itself, by modeling in concrete form abstract entities such as mathematical equations, and by enabling users to surmount problems of scale in manipulating atoms and galaxies alike."

Mike Backes (who has just finished a computer-based multimedia project on a grand scale, namely the James Cameron–directed, 20th Century Fox movie *The Abyss*, which used Macintoshes throughout the production in a variety of ways) talks about his personal wish list for a new telemorphic workstation and interface. "What do I need? Well, high-speed graphics coprocessing, a transparent video window, frame-grabbing, storage to a VCR or read/write optical disk and 3D routines in ROM, just for a start. It's definitely time for 3D. We have a two-dimensional interface already. We need a three-dimensional interface."

Unlike past days of multimedia sizzle unencumbered by steak, most of the breakthroughs in telemorphosis have now been accomplished; all that remains is improving speed, and storage and bringing down the price. According to the *The Green Sheet*, (a newsletter put out by the Green Street Gang, a self-confessed "band of innovators" in the new world of confluent technologies, today's $75,000 workstation may

sell for a fifth of that in two years, and be available as a $5000 dollar personal computer by 1993. Others — including Apple Computer with their *Pencil Test* animation — are experimenting with what might be called "floating studios": net-works of yoked personal computers that can accomplish with distributed processing some tasks that could previously be accomplished only by a Cray-2 or other such supercomputer.

Even Backes's requested 3D interface may not be far away. In advanced technology laboratories, interface pioneers are working with a variety of input/output and display devices that mimic, and in some cases improve on, our three-dimensional, multisensory world.

Much has already been made of the possibilities of head-mounted display, a computer screen built into wrap-around goggles that can simulate depth perception. The effect, which provides each eye with a slightly different view, is similar to familiar stereoscopic toys, but its areas of application are far more exciting. The illusion of depth and three-dimensionality can also be enhanced by the phenomenon known as *motion parallax*, the shift of the background that occurs when an observer moves relative to an observed point in space — the "point of regard" that is also the key to "eye tracker" technology such as has been used by Madison Avenue for years in effectiveness-testing visual advertising.

One relatively inexpensive head-mounted display is already offered by Reflection Technology of Cambridge, Massachusetts, a small CRT screen that drops down over one eye like a pirate's eye patch, displaying at "optical infinity" using a miniature projection tube and sophisticated reflective optics.

Once you can see into the telemorphic universe, how do you work there? One solution could be the DataGlove, a piezoelectric glove developed by VPL research, Inc. The key component of DataGlove is one of the most sophisticated and responsive of all mechanisms — a human hand. Equipped with a special sensor to register position and orientation (manufactured by McDonnell Douglas's Polhemus Navigation Sciences division), such a glove can record hand and finger movements and give force-feedback information. Perhaps most intriguingly, piezoelectric gloves in conjunction with head-mounted display can manipulate imaginary objects in three dimensions, giving the users sensations of touch and resistance. A whole-body DataSuit is also being made.

Fascinating areas of inquiry are opening up, and not only for computer scientists. Artists and philosophers can begin to wonder, too. When an illusion is perfect, when it comes in three dimensions, with lifelike feel, sound, smell, in 1500-line stereoscopic color, how is it different from the

things that our senses tell us are "real"? Will "Big Mother" tele-morphic babysitters be more lovable than Real Mom, who isn't programmed to be nice all the time? Will realer-than-real telemorphic pornography upset the delicate dance of compromise between the sexes?

Great technological leaps always raise problems of conscience and culture, but the multimedia revolution, in which invisible computers will "just be there when we need them, like AC power," as Myron Krueger says, will undoubtedly raise some issues we can't even imagine yet. In the meantime, however, breakthroughs are cropping up right and left, and many of them are commercially available. The technology employed in the DataGlove has made its way (in a far more limited fashion) into Nintendo's Mike Tyson's Punch-Out game, where children (and other users) can punch their television with Brøderbund's U-Force glove and have it register on a cartoon figure. (The true hazards of the telemorphic future will become obvious when a TV Tyson is allowed punch back.) Myron Krueger's Artificial Reality

Artificial Reality
by Myron Krueger
Addison Wesley
83 Jacob Way
Redding, MA
01867
out of print

VIDEOPLACE and **VIDEODESK**
Artificial Reality
Corporation
P.O. Box 786
Vernon, CT 06066
203/871-1375
Prototypes

The Green Sheet
Green Street Gang
Green Street
San Francisco, CA
415/391-9400
$395/year

Corporation makes VIDEOPLACE and VIDEODESK, which are, in a way, the inverse of such live-wall rooms as Stuart Greene's proposed Holoverse. In VIDEOPLACE, the user is photographed on real-time video, and his or her image is dropped into the middle of an environment that

exists only on a computer screen, a place where telecommuting parents and their children could play together, or where telecommuting co-workers could resolve complex issues in a very free-form environment.

Input is no longer restricted to that which can be typed. A dozen years ago, Nicholas Negroponte and Richard A. Bolt demonstrated the feasibility of voice recognition at MIT. Now, several companies provide inexpensive voice recognition devices, enabling computers to recognize as many as a couple of hundred separate vocal commands. IBM's Thomas J. Watson Research Center has an experimental system that they say has a vocabulary of 20,000 words — virtually the standard vocabulary of the average speaker of English. It can even, they say, interpret difficult homonyms like "two," "to," and "too."

Other novel interface approaches have already reached the marketplace. Write-Top, from Linus Technologies of Reston, Virginia, is a PC-compatible computer whose keyboard and monitor have been replaced by a five-by-eight inch flat liquid crystal screen and mechanical pencil, allowing the users to do all of their data input in their own printed hand. Write-Top translates handwritten letters (which the computer has learned from the user in about half an hour) into ASCII. Linus Technologies says that with a little refining, the algorithm will be able to handle cursive as well.

All this innovation in the developer community is not lost on the large computer manufacturers, despite their dreadnought-like inability to make sudden turns. Even Big Blue appears to be heeding the telemorphic call.

"It's amazing the commitment IBM is making to multimedia," Nick Arnett told the *San Jose Mercury*. Arnett, a market analyst with Creative Strategies Research International of Santa Clara, suggests that if IBM is moving, big things are in the offing. "They usually wait for a technology to develop."

Indeed, the staid and conservative giant seems to be diving into multimedia in an uncharacteristically reckless way. In conjunction with Microsoft Corporation and Intel, IBM has announced that they will create a "multimedia" personal computer

for home use — a bold move into the dreaded consumer market long ceded to the Japanese. One media analyst predicts that this computer will be a modified PS/2, available in the first quarter of 1990 at the rather staggeringly low cost of about $2500–3000. Apple Computer has also publicly announced that the Macintosh will be a multimedia computer, and Apple president John Sculley has used HyperTV- type demonstrations at several large meetings.

Thus, as the do-it-yourself credo exemplified by Apple's HyperCard meets the search for more and more transparent systems, the obvious trend is toward a vanishing interface, one that will allow users like Mike Backes to assemble their own applications. The question is, will the interface be allowed to wither away, or will corporate interests — who, as buyers, often control the marketplace these days — be able to hold back the forces of change, insisting on familiar representations like desktops and windows?

IBM, for instance, has long downplayed or outright ignored the interface and human-factors engineering in their designs (a fact that many feel is directly responsible for the disaster of the PCjr, with its cramped, odd-feeling keyboard), but when it comes to the ubiquity of future multimedia, Big Blue may have seen the light. Besides their announced home multimedia computer, they have already entered into partnership with Sears on The Prodigy Service, a venture that will almost certainly lose money for years, but which may also provide the first system of pipes to bring hot-and-cold running data connectivity into and out of every home in the United States.

"The future enters into us, in order to transform itself in us, long before it happens."

— Rainer Maria Rilke

So what could the telemorphic future bring? On-the-spot studios in which far-flung personnel can get together in a coprocessor "space" wilder than anything in William Gibson's cyberpunk novel *Neuromancer?* A future where the walls of your house or office or studio can serve as windows on all the world's past knowledge and current information, or as doors into a three-dimensional, multisensory world limited only by the ability of humans to perceive and create? Total transparency of infrastructure that could join artists and scientists and

just plain folks in ever-changing networks of shared experience and experimentation? Television as a medium of entertainment that, instead of offering a rigid, predefined set of choices, the viewer could respond to, and where the choice of experiences was only limited by the number of ideas that could be translated into a telemorphic format — in other words, where choice would be virtually unlimited? In the telemorphic future, artists may work in dimensions of parareality heretofore unglimpsed. Students and citizens may be able to graze in the nearly limitless meadows of information that could be opened for their use.

It is foolish to glibly predict what the future *will* be. There are many obstacles, both political and economic, that stand between our present and these best of possible outcomes. Still, we can imagine what might be, and in these exhilarating times we begin to see the true possibilities before us. As the interface disappears, as words like *computer* and *multimedia* become as meaningless as *capacitor* and *resistor* are to the average electricity user, we may at last be able to do the real work we long to do. We may approach a kind of telepathic communication, in which that which I see in my head I can show to you, and in which you can respond in the same way. We will then, truly, be dreaming over distance.

Neuromancer
by William Gibson
Phantasia Press
313/855-3737
$18

Private Eye
Reflection Technology
240 Bear Hill Rd.
Waltham, MA 02154
617-890-5905
release date: 3rd QTR. 89

DataGlove
VPL Research, Inc.
656 Bair Island #304, Redwood City, CA 94063
415/361-1710
$8800 (plus accessories)

DataSuit
VPL Research, Inc.
$50,000

U-Force
Brøderbund Software
17 Paul Dr., San Rafael, CA 94903
415-492-3200
$69.95

WriteTop
Linus Technologies, Inc.
11130 Sunrise Valley Drive
Reston, VA 22091
703-476-1500
$2995, $3100 with hard disk drive

The Prodigy Service
Prodigy Services Co.
445 Hamilton Ave.
White Plains, NY, 10601
800-822-6922, ext. 205
$49

Tad Williams, author of the best-selling fantasy novel *Tailchaser's Song* and more recently *The Dragonbone Chair*, also works in the Knowledge Engineering Department of Apple Computer, and has a video production company with his partner, Andrew Harris.

REALITY CHECK

by Linnea Dayton

The electronic age has a particular look and feel to those of us whose vocations (or avocations) are intimately (perhaps inextricably) involved with its hardware and software. This column has less to do with hardware, software and the products we generate with them than it does with the way it feels to deal with the pc and all its power. Topics of some future "Look and Feel" columns will probably include desktop slavery (or whatever happened to all that time computers were supposed to save us?), computrogenic diseases (such as mouse elbow and eyestrain), instant gratification (or "What I like about desktop publishing is that it gives me control of the process!"), elitism (or exactly what do we mean by "anyone" when we say, for example, "Now anyone *can have real-time animation on the desktop," and the evolution of FAX (from "Urgent! Action required!" to junk mail in one short year).*

But the topic this time has to do with reality and our changing perception of it.

hird-Generation Software for Writers" in *Verbum 3.1* was, shall we say, not entirely on the level. However, it wasn't meant to be a cruel hoax. I thought it would be obvious that the three programs that Michael Rossman recommended to help writers deal with the whims of editors were imaginary. But that's probably because I live and breathe the writer-editor relationship (mostly from the editor's point of view, and I can tell you we're not the dragons he makes us out to be), and I also live with three avid sports fans so I understood the reference to Cosell software.

To some of our readers, though, it wasn't at all obvious that the programs existed only in Mr. Rossman's imagination. Several people contacted us for source info because they thought Padit, Turgidify and Chameleon were real and they wanted to know where to get them. A few more cautious readers said "I don't really think these things are real, but I just wanted to check...." And my guess is that many others believed the programs were real and were horrified by that "fact."

One reader took us to task, and rightly so, I think, for not making it absolutely clear that we were poking fun. Because the point is that these programs *could* be real, couldn't they? The technology exists to build them, and there's certainly no law against it, so if someone perceives that there's a market for them, they're probably on the way.

Part of what made the programs seem real, I think, were the digitized photos of the three disks. Seeing is believing, isn't it? There were the three professionally labeled disks — actually they were dummied up by our art director, but how could anyone tell that? Seeing is believing. But that's beginning to get dangerous.

This issue of *Verbum* is all about hardware and software capable of creating simulated reality, and about the fact that that capability is becoming much more widely available than it has been before. How will we recognize what's "real" and what's manufactured, when digital photography, pc-generated virtual reality, scanning and image editing, and anthropomophic agents constitute a larger and larger percentage of the material that comes to us via electronic media. How do we recognize it today? What is reality, anyway? We're all going to be spending more time than we used to, I predict, doing reality checks.

eoffrey de Valois, award-winning executive producer and director of *Computer Dreams* (see "New Frontier Products") has created a synthetic actress, Meggy Byte, who will be the co-host of a "Computer Visions" television show. Says Valois, "I think computer-generated actors will fundamentally change the nature of films and TV in the 1990s....Within a few years we'll be able to create computer-generated actors who will look so real, you won't be able to tell the difference between them and human actors."

(Not only create computer-generated new actors, but resurrect dead human ones. The issue of colorization — which adds an element of reality to old black-and-white films, or does it tamper with the particular kind of reality associated with the medium? — seems almost trivial compared to the controversy that is already starting to brew over digitizing expressions, move-

DESKTOP PUBLISHING WITH MICROSOFT WORD ON THE MACINTOSH

At 2:25 by my menu bar, Clara McConnell walked in looking like Death warming up. From her red hair to her Reeboks she was a seething pantomime of fury and aggravation. Eyebrows raised, I pointed my thumb over my shoulder. She nodded. Victor's cubicle was just on the other side of the partition in Accounting.

The Surly Serb had never been my idea of a good match for her. She finally spoke, a spitting whisper. "I know something's wrong, and he won't tell me what." This woman has a Ph.D. in psychology? He had been cranky all week. Everyone was steering clear.

I whispered back. "Maybe with all this talk of going public he's getting ideas about you two."

Clara blushed. And at her age. "Delilah! Not yet."

"Bigshot VP of Projects sleeps with lowly accountant. Just in time for the July issue of the Unobtrusive News." She cringed. I grabbed my mouse. "Let me open up a new file."

"Oh, be nice. If you weren't my friend..."

"And confidante," I added. A phone rang. We froze. It was for Victor. Through the wall in his office--

"Markovsky," he barked. We held our breaths. "Al, you have no idea what I'm going through right now. Why are you

ments and speech of favorite actors of the past and then rearranging them into new films with new screen plays and new [perhaps anthropomorphic] supporting actors.)

Elon Gasper of Bright Star Technology (see "HyperAnimation" in this issue) responds to the call for legislation about what we can and can't do with anthropomorphic agents: "It is our privilege to live in a time and place when the opportunity to determine the direction of progress is in the hands of individuals....Let's not put a straitjacket on creativity and innovation by adding more unnecessary laws."

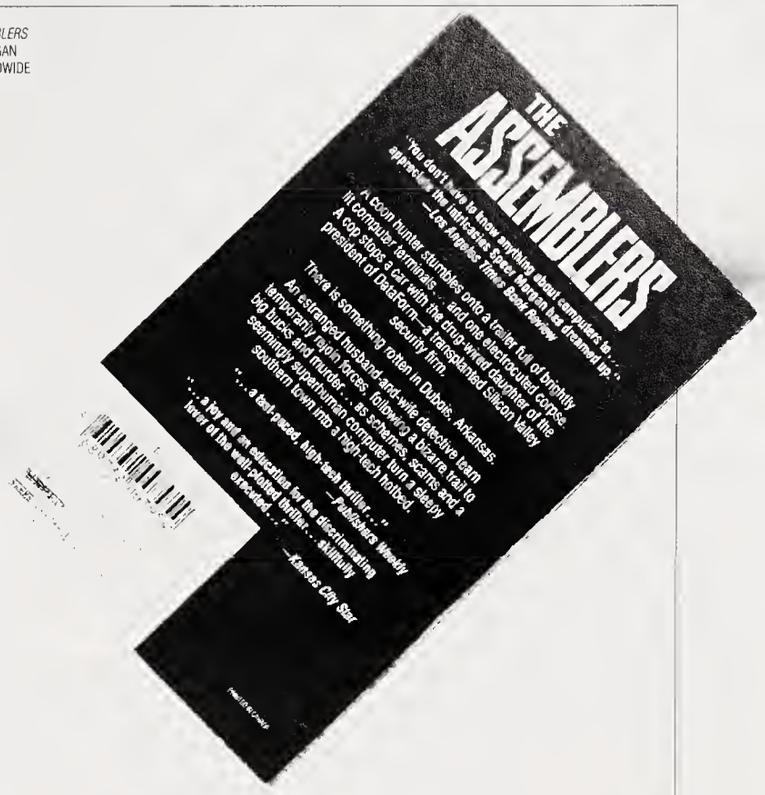
Here's another side of the computerized reality coin. Besides turning ideas into virtual reality, computers are pretty good at turning data into information. One of the best-known roles of computers is to process data collected in the real world. Computers also play a prominent role in scientific modeling. Today, in many branches of science and engineering, a desktop computer put to work on a problem can do overnight what previously would have occupied an entire mediocre career.

As software for communication and data analysis improves and databases proliferate, we're bound to see the democratization of data analysis, right along with the democratization of computer graphics, with somewhat comparable results. Easy access and fast analysis will mean that more people will be turning data into information, synthesizing, drawing conclusions based on the "real facts" databases provide. There will probably be some brilliant new insights — and probably also some conclusions that have a distinct "desktopped" flavor. Perhaps we'll be able (and tempted) to draw and implement these conclusions earlier and based on fewer data sets. That would seem to make it more important than ever to make sure the "reality" is reliable before the numbers are crunched, to know how to identify aberrations in the data that should be tossed out instead of factored in, to know how different kinds of analysis work and what they can and can't prove, to know how many sets of data are necessary to draw meaningful conclusions — in short, to be able to avoid lying with statistics by accident, synthesizing a myth that we trust as real because we built it from hard data.

If you're interested in exploring the current nature of reality, your trip can start at a bookstore. *The Assemblers* by Speer Morgan provides an absorbing look at the world of computers. The book isn't really science fiction, and it's not set in the future. First published in 1986 and reissued this year (probably with the expectation that the world might now by ready for it), it's a well-plotted thriller set in the world of the assemblers of the code that runs the banking industry worldwide. It provides a rather chilling picture of life at the keyboard in the "code factory," makes the reality of banking system vulnerability all too clear, and shows how computers can make everything easier — even murder.

If you want to do your reality check in the form of a short, always mind-stretching and always entertaining bimonthly, try *the jamais vu papers*, conceived and produced by Pat Perrin and Wim Coleman, two recognized writers who enjoy dealing with ideas intensively. *Jamai vu* is a French expression: Did you ever get the strangest feeling that you've *never* been here before? That's *jamais vu*. The *papers* is a newsletter, (sometimes a "comic book," sometimes a collection of clippings, sometimes an interview of a real person by a fictional character, sometimes a desperate note scrawled by hand) that weaves together imagination and what we seem to accept as reality. In part, it chronicles this time in which a growing number of people quietly discount the version of reality that comes to them via newspapers, radio and television, a time that is likely to make skeptics out of the gullible, and cynics out of skeptics. The newsletter explores possible realities — the possibility of a hoax (or a computer-created world) becoming real just because it's put forth into the world, for example. Back issues of the newsletter are available, and publication of a *jamais vu* novel is planned for the spring of 1990.

THE ASSEMBLERS
SPEER MORGAN
1986, WORLDWIDE


THE ASSEMBLERS
"You don't have to know anything about computers to appreciate the funniest, Speer Morgan has dreamed up." —Los Angeles Times Book Review
A Coon hunter stumbles onto a trailer full of brightly lit computer terminals... and one electrocuted corpse.
A cop stops a car with the drug-wired daughter of the president of DataForm—a fiercely competitive Silicon Valley security firm.
There is something rotten in Dubois, Arkansas:
An estranged husband-and-wife detective team temporarily rejoin forces, following a bizarre trail to big bucks and murder... as schemes, scams and a seemingly superhuman computer turn a sleepy southern town into a high-tech hotbed.
"...a fast-paced, high-tech thriller..." —Publishers Weekly
"...a key and an obsession for the discrimination lover of the well-plotted thriller... skillfully executed..." —Kansas City Star

If you'd like to use a video as a starting point for exploring the changing relationship between electronic media and reality, try *Penn & Teller's Cruel Jokes for Dear Friends*. In their videotape, these masters of manipulating reality provide complete instructions and "interactive" hoax videotape segments that let you distort reality yourself in some pretty interesting ways for fun and profit. The tape comes with props that make the illusions seem even more real.

Desktop Publishing With Microsoft Word on the Macintosh by Tim Erickson and William Finzer sounds like an unlikely source of entertainment on the subject of the look and feel of the computer age. But if you pass it by, you'll be missing something — particularly if you're interested in creating pages with Word, but even if you're not. Once you get into it, this large, thick paperback has the look and feel of hypermedia between book covers. A small, very cleverly written detective story winds through the book, with a "chapter" of the story at the front of each chapter of the book. Set in the world of desktop publishing, this entertaining tale hooks you — and you read it all the way through, thereby exposing yourself to every subject area covered by the book's "real content." You begin to feel like you're operating in a HyperCard stack, if you've ever done that, following one path but seeing lots of other trails to explore in the future. The "real content" is pretty interesting too, once you get into it. You'll find that you can do a lot more with Word than you might have imagined. Even though it covers the program only through version 3.02, it's worth looking at.

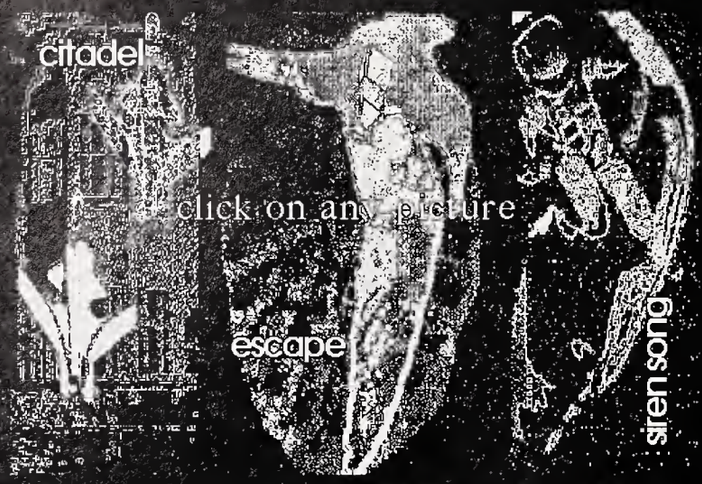
It looks like reality checks are going to become an increasingly important part of our lives for awhile. Maybe someday it will all be a moot point: "Remember *reality*? Now *that* was an interesting concept."

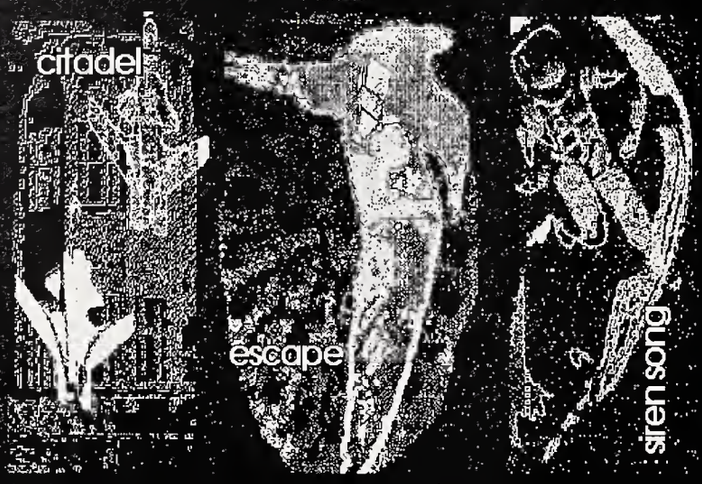
The Assemblers
Speer Morgan
1986, Worldwide
Available at bookstores, $3.95

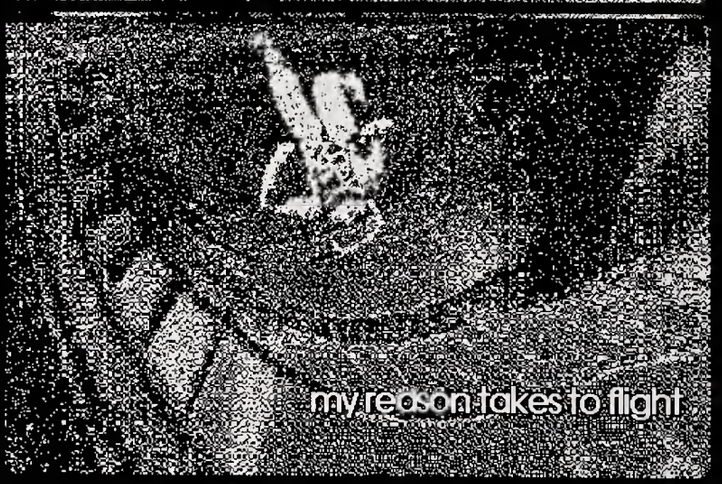
the jamais vu papers
Wim Coleman and Pat Perrin
P.O. Box 42156
Los Angeles, CA 90042
213-227-1451
$20/12 issues

Penn & Teller's Cruel Jokes for Dear Friends
Lorimar
Available at video stores, $19.95

Desktop Publishing With Microsoft Word on the Macintosh
Tim Erickson and William Finzer
Sybex, 1988
Available at bookstores, $22.95





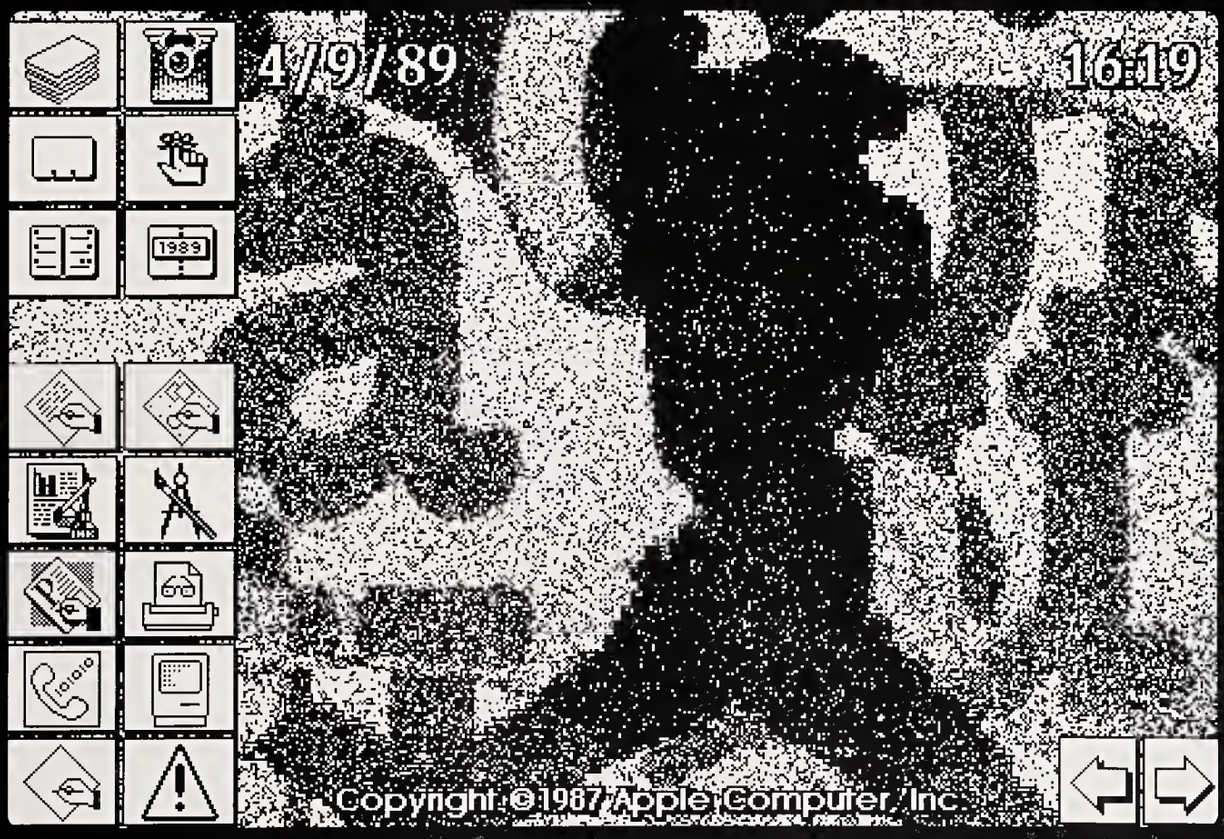


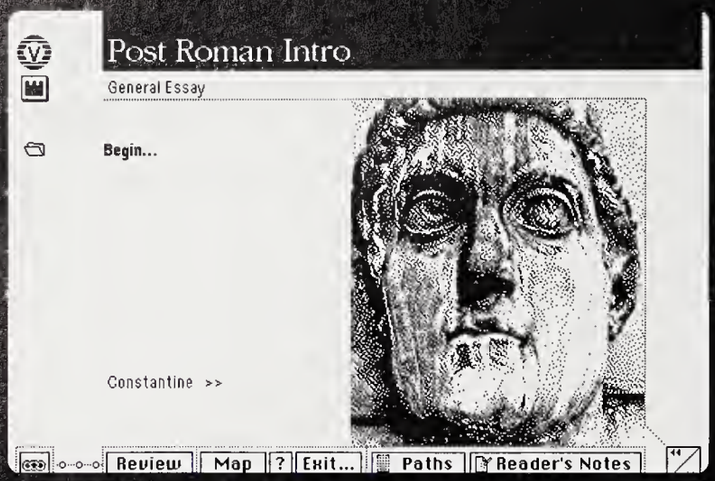
HYPER HYPER HYPER HYPER HYPER
gallery

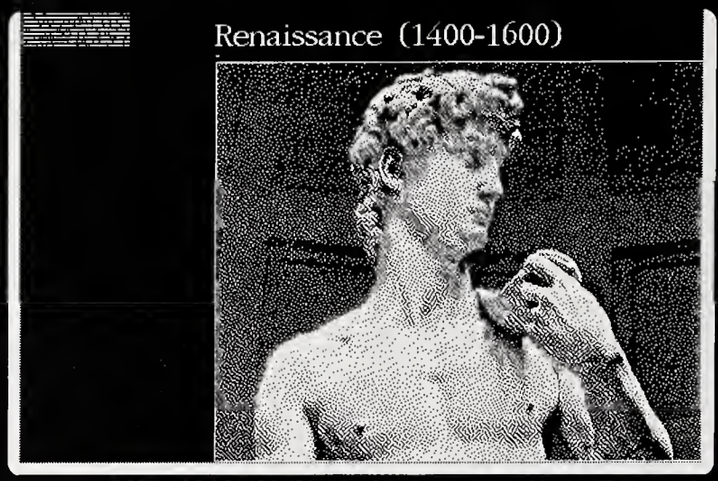
MIKE SWARTZBECK

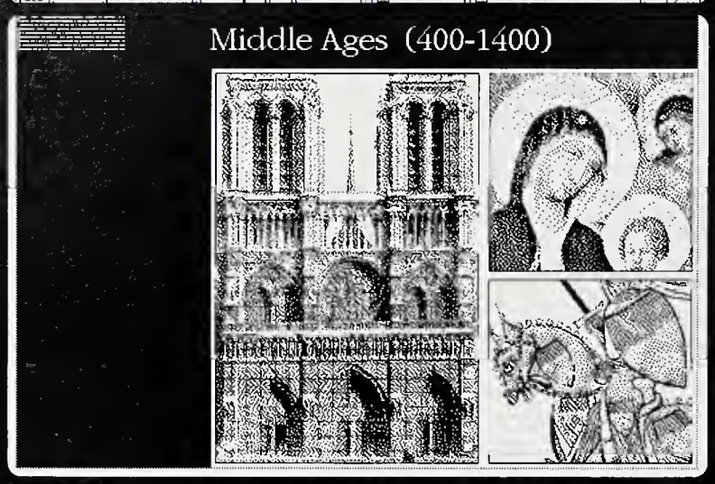
Verbum editorial artist Swartzbeck put HyperCard to creative use not long after it came out. His "Poetry in Motion" combines bitmapped images, lines of poetry and animation effects in a striking new art form. He has programmed the works to provide a different variation of the given video-poem each time you activate "Citadel," "Escape" or "Siren Song."

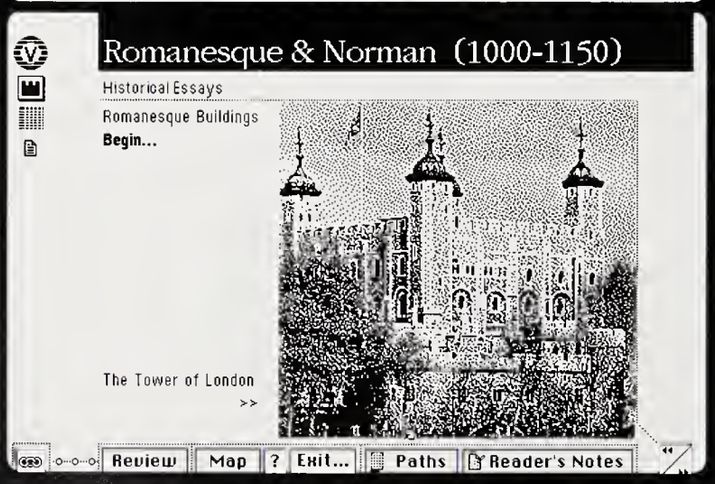
Mike's custom Home Card (at right) is used in place of the desktop. He can open his most often–used applications and files by clicking custom buttons.

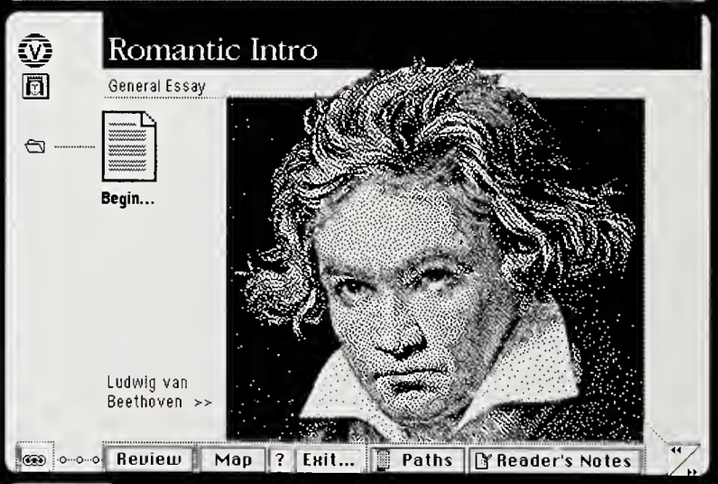








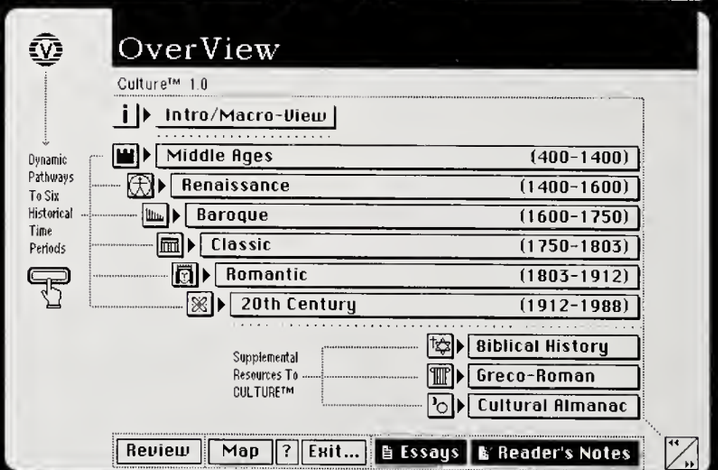




CULTURE 1.0

Culture 1.0, the HyperMedia Guide to Western Civilization, allows you to navigate through 1750 cards that make up a guide to over 2800 years of Western history and culture. Buttons are provided to access general essays about the Renaissance, Baroque, Classic and Romantic periods, art and music essays as well as pictures of works of art and signature melodies of historical periods. Future updates to Culture 1.0 will include Culture 1.1, a one-disk upgrade covering the 20th century; The Interacting Muse, a series of six CD-ROM disks that feature the artists, sculptors, architects, musicians and other historical figures from the Middle Ages through the 20th century; The Music Tours, a set of six 800K disks that explore in greater detail the music of the six periods in The Interacting Muse, and Culture 2.0, an expanded CD-ROM version of Culture 1.0.

Culture 1.0
Cultural Resources, Inc.
7 Little Falls Way
Scotch Plains, New Jersey 07076
201-232-4333
$175



INTRODUCING HYPERVISION™

for the ProViz™ Video Digitizer. The first Real–Time video software designed exclusively for HyperCard.™

Real–world images increase the educational power of HyperCard.

Video to HyperCard...

Now you can capture virtually any video image *directly* into your HyperCard stack, without the need for still models or a freeze-frame. With just one click of the mouse you'll instantly grab images from camcorders, VCRs, laser disk players—even television.

HyperVision is the new software interface to HyperCard for the line of ProViz Video Digitizers. Because HyperVision was developed specifically for the ProViz Digitizer and incorporates Apple's HyperScan™ software, you can capture and display images with unparalleled clarity.

Real-time and more...

- Real-time image capture for frame-grabbing or live pictures.
- Image scaling and cropping.
- The dithering algorithms from Apple's HyperScan software.
- The extra features of the ProViz software, including image capture in 16 shades of gray and 256 shades of gray.

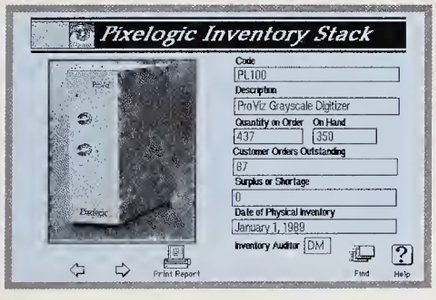
Real–time images bring personnel stacks to life.

...on the entire Macintosh family.

All you need to run HyperVision and the ProViz is:

- Any Macintosh—a Plus, SE, SE/30, II, IIx, or IIcx—with 2 Mb of RAM and a hard disk.
- System version 6.0 or later
- HyperCard version 1.2 or later.

Real images bring product information into focus.



Just imagine what you can do with real-world images in your stacks:

- Add frames to the HyperCard front-end of an interactive videodisc.
- Supply your customers with an electronic sales catalog.
- Add product shots to your on-line documentation and demo disks.
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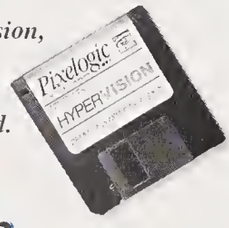
Free Demo Disk

Our self-running demo disk will show you the simplicity and power of **HyperVision**. Call our toll-free number today and see for yourself why we say:

With HyperVision, HyperCard never looked so good.



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The Vision of the Future

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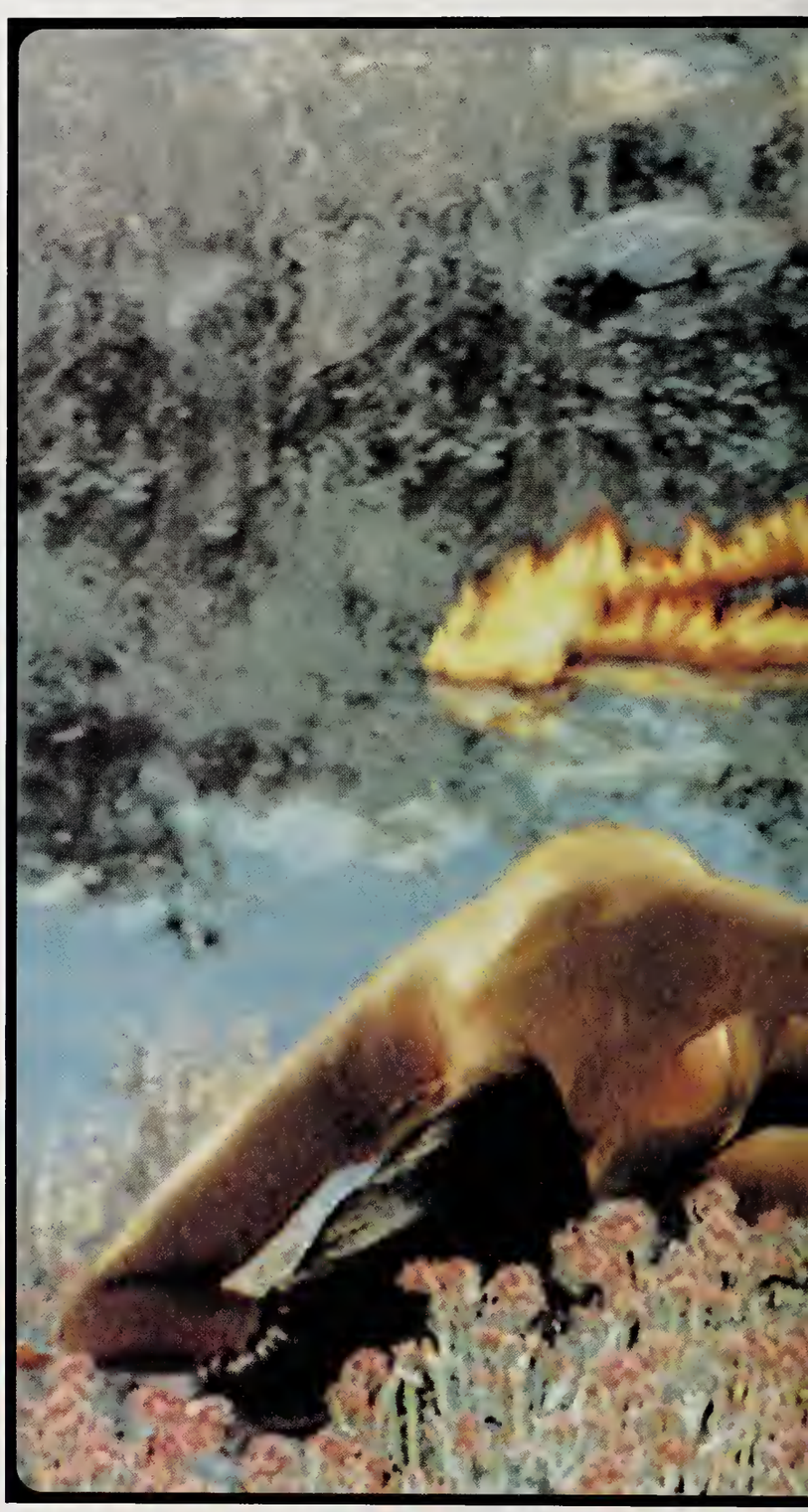
gallery

MICHAEL JOHNSON

An Orange, California fine artist, Johnson has developed digitized image compositions we might call "HyperRealism." Mr. Johnson has exhibited his work at many galleries since the early '70s, and has been working almost exclusively with digital art for the past 4 years.

"Paradise Lost" (spread) and **"Heroes, Fools and Other Dreamers"** (below) were created in early 1989. Johnson used an AT&T Targa 16 Graphics Buffer board on an MS-DOS system. He uses a JVC video camera and a Howtek ScanMaster 35mm scanner to input his photographs and found images. To edit his scanned images he uses the TIPS paint package, along with Rio and RioPcs software for moving his images around as objects, assigning levels of transparency and refining the final image for high-resolution. The images are reproduced here from high-resolution (2000-line) 35mm slides which were output on a Matrix film recorder.



"Anunciation" (left) was created in 1987 using an 8-bit, 256-color Number Nine Graphics board and Xiphias' Sketch 9 painting software. The final work was produced on a billboard screen printing system as a 9'9" x 7'1" mounted canvas.

LARRY WITTNEBERT

Computer graphics were integrated into the video production of *The Seagull*, put on by instructor Wittnebert's advanced production class in the Broadcast Communication Arts Department at San Francisco State University. The computer-generated set designs provided a semi-realistic look and allowed nearly instantaneous modifications while working with live video of the actors. Two paint systems were used: a Truevision TARGA board and software running on an AT clone, and an Amiga using Deluxe Paint II.

The top still from the video shows an ominous sky background created from digitized images on the Amiga, and then keyed in behind a window that was part of the physical set. The tree trunk at left in the bottom image was part of the set, but the fractal branches protruding to the right were generated with TIPS software on the Targa system.

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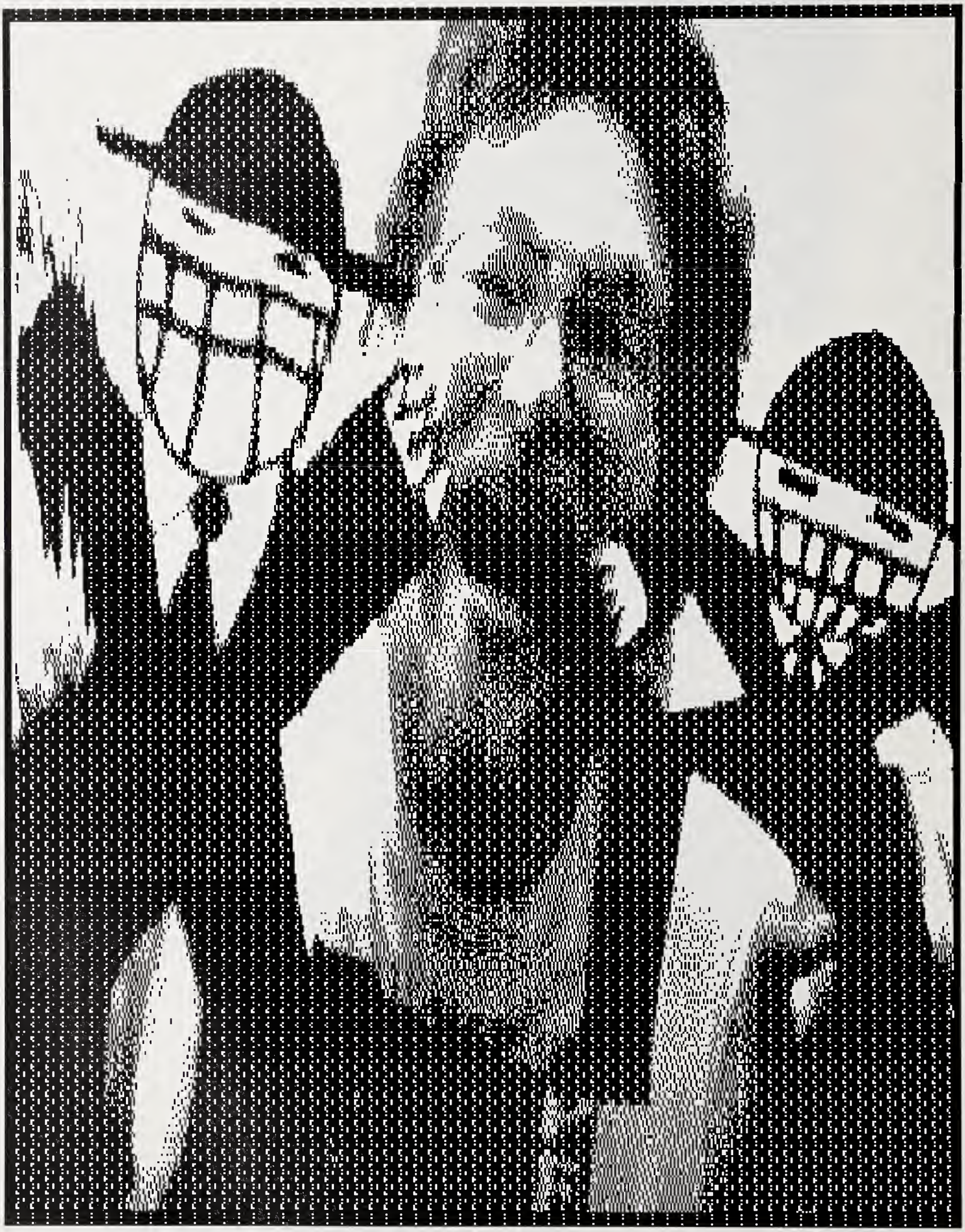
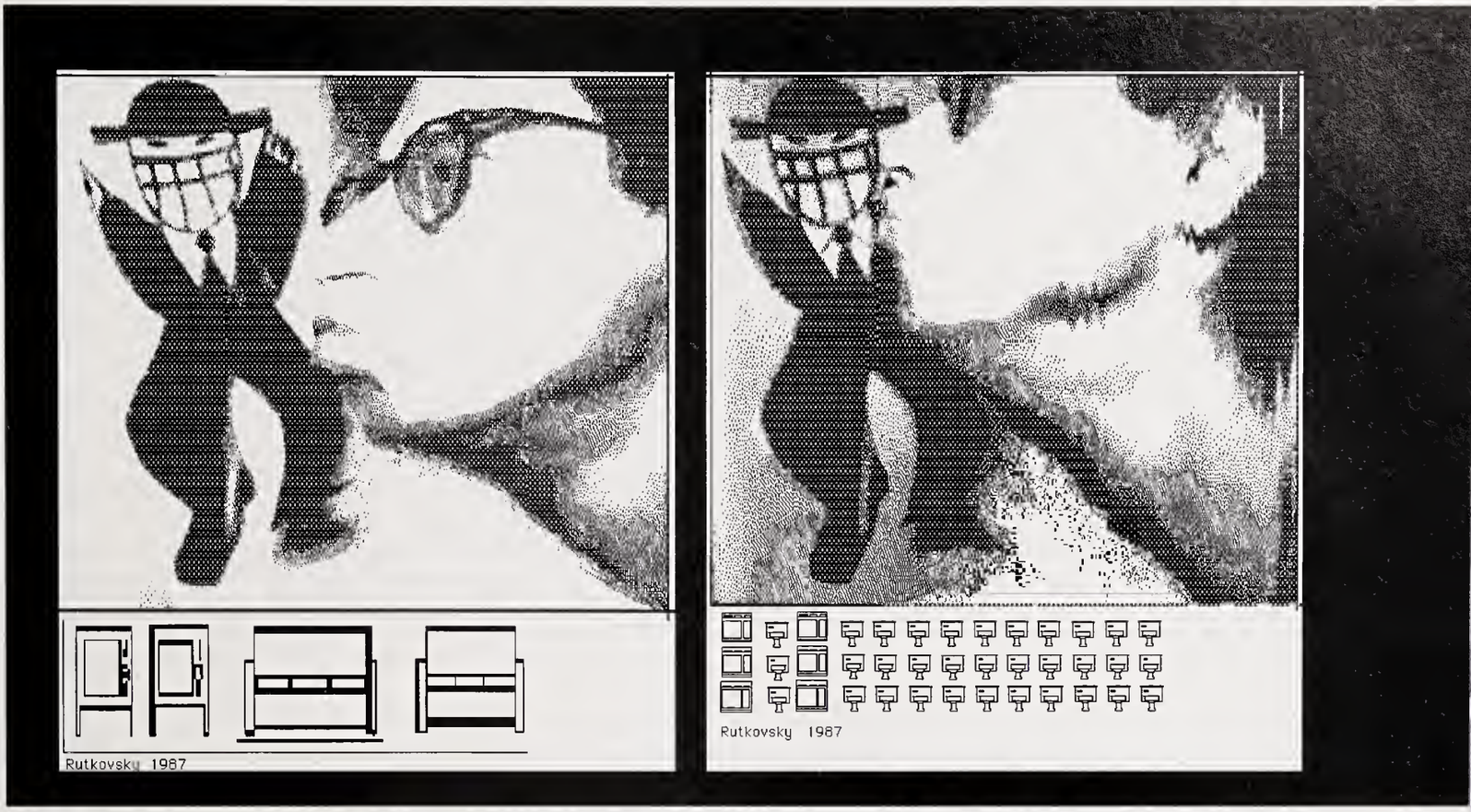
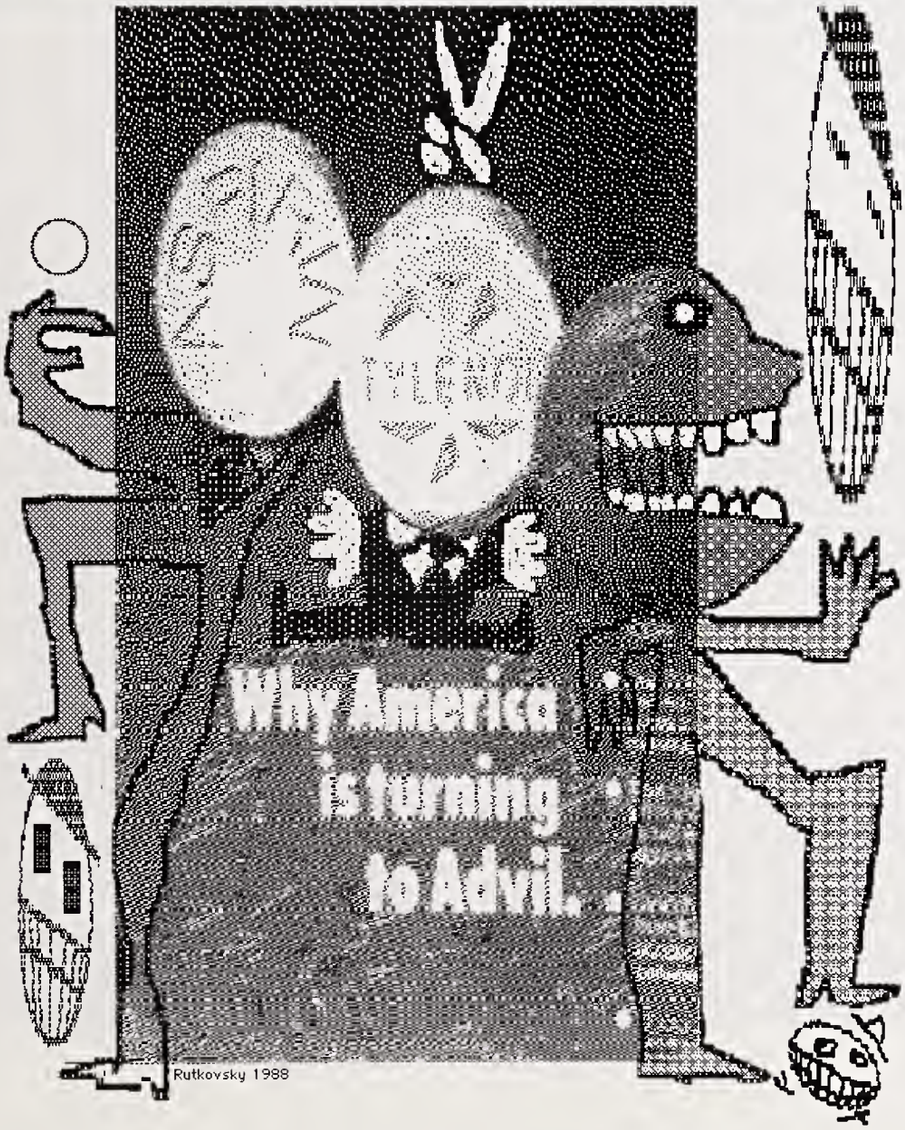
gallery

JOHN ODAM
Art director Odam scanned this model using MacVision, a digital black-and-white video camera and careful lighting.





gallery



PAUL RUTKOVSKY is a well-known concept artist and Macintosh nut, who has been experimenting with "redigitized" images since 1985 (see *Verbum 1.1*). His scanned drawings and live images are combined and manipulated with paint programs such as SuperPaint, and often redigitized for the pixelated effect. These images may foreshadow the on-screen virtual realities that lie ahead with the convergence of hypermedia and artificial intelligence.

gallery

STUART SHARPE
Mac (-romind) veteran Sharpe uses several programs in his VideoWorks Director animations.

"Improvizational Digital" (top) was painted freehand using Studio 8 on a Mac II.

"No Way to Know What the Future Brings" (above) is what the girl in the window says over a music bed in this short MacroMind Director animation. The background was created in Director's paint window. The textures on the buildings were scanned in and tiled. The robot arm was created with Swivel 3D, and the molecular object was created in Pro3D and colored in Clip 3D. The woman's face was scanned with MacVision video digitizer and distorted and smoothed in the Director paint window. The voice in the animation was digitized with Farallon's MacRecorder, and the music, including sampled guitar and percussion, was added with OpCode's sequencer.

"Slice of Life" (right) was created by capturing a still from video tape using MacVision. It was then colored and modified using VideoWorks Director's graphics tools.

Sharpe

INTERACTIVE MULTIMEDIA

HYPERANIMATION

■ *by Elon Gasper*

The future of communications technology will be a multimedia one that includes computer animation and sound. The transition to it is now beginning with software that lets computers mimic the sequential presentations of traditional motion pictures on celluloid strips and videotapes. But the ultimate power of multimedia for communication will lie not with prerecorded movies but with true random-access animation. This means real computer-generated motion pictures, but interactive ones, under the precise online control of the computer.

Making Heads Talk

The synergy of sound and animation has potential barely explored. A particularly powerful synthesis of the two media links synchronization of speech with facial animation to create synthetic actors, also called *anthropomorphic agents*, who can "read" scripts stored in text form.

The advent of agents is made possible by HyperAnimation, the first general-purpose software system for random access and display of images on a frame-by-frame basis. With HyperAnimation, anthropomorphic agents are created this way: A face is imaged in each of several expressions associated with speech production. The images are stored, along with a set of speech-fragment sounds. And the designer of a synthetic actor weaves the patterns of human speech and facial images into a talking character able to "read" scripts typed in and stored in text form for the agent to say. HyperAnimation converts the text into speech and mouth movements synchronized to the words. With HyperAnimation, a cartoon character or a more realistic-looking representation of a human can deliver lines never spoken before, complete with appropriate facial movement.

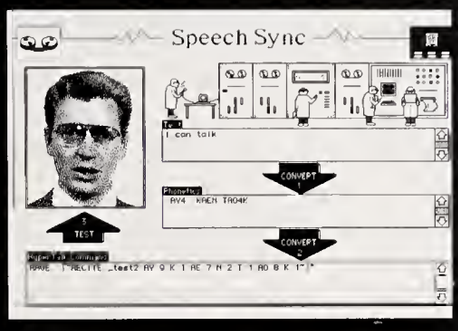
Anthropomorphic agents can function as knowledge navigators, as demonstrated by Apple's visionary John Sculley in his videos. The Macintosh-generated "Albert" character created by Harry Anderson's StakDek company and now appearing in the Disney TV series *The Absent-Minded Professor* is another example of this fascinating new technology.

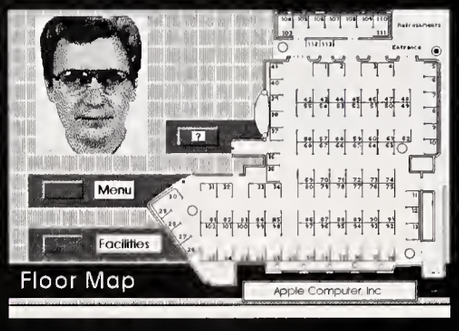
HyperAnimation is based on a software engine called RAVE, which presents synthetic actors and a modeling language called RAVEL that describes sounds and facial movements. Like hypertext, HyperAnimation enables its users to transcend the limitations of linearity to create a whole new realm of possibilities. It frees the designer from the sequential nature of animation, which restricted previous works to prerecorded performances.

HyperAnimation is a general-purpose technology, not simply a HyperCard extension. But the Macintosh version of HyperAnimation software does function with Apple's HyperCard system and with Silicon Beach's SuperCard. Together they enable users to quickly create and test scenarios with talking faces. Disney likes it, for example, because it's easy to change Albert's script — instantly Albert says different lines, avoiding the expensive reanimation process.

Today's HyperAnimation agents are designed to enable plug-and-play compatibility with upward developments in hardware and software environments. As the multimedia wave washes over us, designers of interactive presentations will be able to plug in smoother and better synthetic actors to enhance their work with minimal effort.

(Left) HyperAnimator's Dressing Room provides paint tools and buttons for creating and editing anthropomorphic agents and controlling lip positions and facial expressions.
(Right) Albert, an agent created by StakDek, Inc., was used by Disney Studios in its remake of *The Absent-Minded Professor.*





(Left) The Speech Sync Lab in HyperAnimator synchronizes digitized sound resources with animation art.
(Right) HyperAnimation provides "talking heads" that can read scripts for interaction with users.

Synthetic Actors Take the Stage

Talking agents are currently featured in corporate training programs. Codex, a division of Motorola, used HyperAnimation to develop a product that trains new employees on company procedures and technology. It features talking characters who introduce themselves, interact with the user and simulate what they do in the company. Another important use of HyperAnimation today is storyboarding for artists, cartoonists and business users. Whether the communications goal is helping a client understand a script concept or mocking up a dialog scene for a video, HyperAnimation provides an inexpensive way to quickly create animatics with talking characters.

A new application of HyperAnimation is in computerized kiosks — freestanding interactive information centers and advertising displays. The University of Washington debuted an agent as a kiosk guide for a Seattle trade show in March. Studies have determined that if the attention of a potential kiosk user is not established in the first three seconds, the kiosk will not be used. A friendly agent breaks down barriers that people have to the use of computers, and the attention-getting qualities of HyperAnimation are available to designers at a fraction of the cost of traditional presentation videos. In addition, agents can interact with the user, which allows far more flexibility in design and use of the kiosk. And the advertising and other messages they deliver can be easily modified, even in the field.

Talking agents will be used routinely as friendly "hosts" for computer users of large databases. They will require virtually no training to use because the computer user is accustomed to face-to-face conversational interaction. Eventually there will be presentations featuring synthesized celebrities you create, change and interact with — for example, Bugs Bunny, Bill Cosby or even *you*. The characters in these interactive media will seem to be alive. They will be able to say something new and to communicate information effectively.

Agents provide a natural interface between people and computers. A young child smiles as a favorite cartoon character teaches reading skills on the computer. A minimally literate worker learns from a computer about how to use new industrial equipment without having to read a manual. A shopper at a mall is guided through a database of daily sales and specials by a friendly kiosk agent.

While Apple's Knowledge Navigator is a vision of the future, HyperAnimation is a technology of the present. The ability to see and use a bit of this vision in your own HyperCard creations is both exciting and enticing. The successful applications already accomplished using HyperAnimator make synthetic agents a reality and lend credibility to John Sculley's prophetic vision.

The future is now. It's time to make the transition from desktop publishing to desktop presentations using interactive multimedia. With HyperAnimation we can weave the strands of the technology together to create truly effective communications tools that bring the power of the microcomputer to all people.

Elon Gasper is president of Bright Star Technology, Inc., developers of HyperAnimator.

HyperAnimator (with HyperCard 1.2.2)
Bright Star Technology
14450 N.E. 29th Place, Suite 220
Bellevue, WA 98007
206-885-5446
$199.95

continued from page 8

over responsibilities that were formerly left to program designers. Like, what do you call the commands on the menu? How do you arrange them? How do you associate various bits of data with various tools? That will suddenly be an option that the user has, an option that was previously decided by the person who wrote the original application. And in this sense, we want to create a continuum of ways to use the system — from the least sophisticated way, in which the user just uses it as is and makes no modification whatsoever, all the way up to the level of someone conceivably making their own version of Hypercode. Hopefully, not a better one than ours. But conceivably all the way up to the level of tearing the whole thing down to nothing but bones, and reconstructing their own animal out of it.

Verbum: So, in a way, it's trying to make good on the promise of the personal computer as the ultimate personal computing environment: It's truly personalized.

TR: Yes, but without discounting the all-important element of connectivity, of being able to communicate through this environment with other users.

Verbum: But don't you think that what a lot of users want is just an ability to access the kinds of applications they want? Maybe they'd like those applications tweaked, customized a little bit, but they want to be able to access and use them in concert. I don't think they necessarily want to create all their own programs.

TR: Well, a lot of people want to play a musical instrument, but very few of them are going to commit themselves to the point of qualifying as a professional musician, or someone who really has explored the possibilities. As I say, there's an entire continuum. There's a person who plays — who just moves around on the harmonica or something. And then there's someone who has learned how to play, who's first-chair concert violinist. Well both of those two people have a right and a "talent" to produce music. It's only a question of desire. It's a question of desire and commitment.

Verbum: So, for example, the paint module you've developed in the Hypercode environment would be a standard program. It has some great features, by the way.

TR: We have some problems with terminology here. Because a "module" to us would be a single element of the whole paint set, which is a set of capabilities, actually. The user can add to or discard from that particular set.

Verbum: But you're going to give them an initial set of capabilities called the paint package — Hyperpaint, or — ?

TR: Yeah. Whatever.

Verbum: And you think that will be one of your first tangible products coming out of this?

TR: Yes. Most likely.

DL: It's important when you think about Hypercode to think about this shift in emphasis. In the computing world so far, the emphasis has been on the applications, the tools. You open up the tool, the application, you use it to create a document that's a product of the application. Or you need a document in another application, and you cut and paste, and then you create. The outside is the tool, the inside is the information. Hypercode reverses that. The outside, the base level, is the arrangement of the media — it *is* the information. The information is what you traverse, it's what you browse through, it's where you are in Hypercode. You're always in the content. When you want to change or modify or process or enhance or do something with the content, you call upon tools, arrangements of tools, that consist of arrangements of modules that you happen to have in your environment. But whether you buy the arrangements premade from us or you buy the modules or you take the modules apart and put them together in your own arrangements, it works the same way. It's like tools in your kitchen. You reach for what you need to do what you do. But it's the food that's the primary object. The food comes first.

TR: It's not imperative that to have a component system, someone would have to implement it the way that we do. But Hypercode as we are implementing it is a hypermedia browser — but more than a browser. It has the ability to associate tools with documents that you browse through. And I guess that's what makes it essentially different from something like HyperCard. It gives you the tools to look at all the different kinds of data that you have. When you're browsing around, a text document doesn't look like a little page icon, something like that. It looks like the document that it is. If it's pictures, it looks like pictures. In that sense, the interface conforms to the hypertext, hypermedia type of program. It isn't necessary that somebody else's particular scheme does that, but that's what ours does. It treats your world of objects as being this *hyperific* world. That's why it's Hypercode. When you get there, you have not just the document but the objects you need to make substantive changes. In Apple's world, Hypercode conforms more to HyperCard than to a typical application. Because it's not a matter of starting an application and pulling documents in and out of the application. You never start an application, there's no such thing as an application. Or there is only one application, and that's it.And you just kind of rubberize it to fit your particular needs, your taste.

Verbum: It's a mind-boggling change in the way we think about the context of computing.

TR: Well, the fact that HyperCard could gain such widespread acceptance shows that people are looking for different ways of visualizing all the data available to them.

Verbum: Yes. But HyperCard is very difficult to get a handle on and to explain and understand, and Hypercode is even more difficult.

TR: I guess it is. But if you look at Hypercode in the context of HyperCard, then it becomes easier to understand — if you don't look at it in the context of being another application or dealing with applications When somebody starts up HyperCard, that's all you got — HyperCard. There's only one kind of data: stacks. That's it.

Verbum: Well, but then again, what's neat about it is this interface, and you can link to all kinds of other applications and functions through that.

TR: Well, you mean X commands and things like that. You could say that Hypercode is essentially HyperCard made up totally of X commands. That it's made up completely out of these modular elements rather than having a rather large essential kernel that allows exceptions to what it does.

DL: Hypercode doesn't have the rigid structure of HyperCard. HyperCard is very, very explicitly structured with levels of objects and basically no recursion within levels. You can't have cards within cards, stacks within stacks, fields within fields. It's all on one level — it's kind of like the file system on the Macintosh before they went to hierarchical file system. Whereas, Hypercode will be completely general, in that your whole world can be contained within anything. More along the lines of the hypermedia concept.

Verbum: So Hypercode is still some time off. What about the FlowFazer screen saver? It is incredible — kind of a customizable digital lava lamp that produces constantly metamorphosing color fields.

DL: It's a teaser for things to come — other programs and future versions of FlowFazer — that will use the same kind of high-res metamorphosing screen graphics.

TR: We'll put that out as our first product. Soon.

DL: The FlowFazer is kind of mesmerizing. It epitomizes the type of experience we want our software to give users. Maybe the FDA will slap a ban on it.

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Director (for the Mac)

VideoWorks II, long the leading animation program for the Macintosh, has been upstaged by MacroMind Director, a full-featured audio-visual environment of real-time graphic animation for producing multimedia presentations, desktop video, and instructional visualization. Its extensive paint program includes gradients, blends, cycles, smudges and reveals, and it can accept and manipulate color scanned images.

Director's Overview window provides a storyboardlike continuity where picture, text, sound, clip animation sequences and over 50 transitions and effects can be cut, pasted and linked to build and edit a full animation document. The Score window is a notational continuity for compositing and synchronizing graphics, animation, text, special effects, and sound. The Auto-Animate function allows the quick creation of bullet charts, graphs and text effects. Sound can be accessed through the internal sound library, recorded directly into the document with Farallon's MacRecorder, synthesized with MacinTalk or coordinated with a MIDI device. Director canexport frames as PICT, Scrapbooks or PICS, print to slide makers or color and black-and-white laser printers and record onto videotape or film.

VideoWorks Accelerator — a memory-intensive utility which speeds up the frame-rate of complex sequences — will not work with Director, but MacroMind has promised to release a new Accelerator by June. A HyperCard Driver and a Driver for Silicon Beach Software's SuperCard are also planned for Director. The program requires 1 MB of RAM for black-and-white operation and 2MB for color.

MacroMind Director, $695. Trade-up from VideoWorks II, $260. MacroMind, 410 Townsend Street, Suite 408, San Francisco, CA 94107, (415) 442-0200. (For similar capabilities for the Amiga, see "DeluxePaint III — Paint With Animation," later in this "4D" listing.)

Showcase F/X
(for the Mac II)
The first in a series of Animation Workshop products for the Mac II, Showcase F/X is a desktop video and presentation program that allows sophisticated animation of text and graphics. The software comes with an introductory video tape, a Guided Tour HyperCard stack and sample data disks. The only video titling software available for the Mac II, it offers scrolls, fades, wipes and real-time motion and can use any PICT screen or genlocked video image as a background, with text displayed on top of the image. For desktop presentations, Showcase F/X will load graphs, pictures and charts from other programs and use them as backgrounds to be manipulated as needed. Text can then be moved over them to complete the animated message. $395. Aegis, 2115 Pico Boulevard, Santa Monica, CA 90405, 213-392-9972.

FilmMaker
(for the Mac II)
The basic premise of FilmMaker is to treat an animation as an object — and since an object can be animated, the software makes it possible to create an animation within an animation. The user takes all or part of a Pixel Paint, Studio 8, Modern Artist or PICT file from the scrapbook, then applies effects like translation, rotation, zoom or transformation, for instance. The Mac then calculates all the frames by interpolation to create an animation. With the Special Effects module, the user can change the color palette of each frame to create effects like fade in or fade out, or can fully synchronize any sound or voice to the animation. Since it's an interactive presentation solution, FilmMaker lets you link animated sequences or HyperCard stacks using keyboard, mouse or timing conditions. L.I.V.E. Software, 4 Rue Robert Schuman, 94220 Charenton, Paris, France, 33-1-43-78-99-99.

HyperVision
(for the Mac SE or Mac II)
The first software that lets you capture video images directly into HyperCard, HyperVision eliminates the need for XCMDs or file imports. The program incorporates HyperScan, the software interface to HyperCard for the Apple scanner. When used

STANDOUTS

with the ProViz Video Digitizer, it can bring high-quality, 1-bit images into HyperCard and display them in a HyperCard window of 512 x 342 pixels. Then a complete range of brightness and contrast controls, filters, dithers and preview screens is available for editing the image. $195. Pixelogic, 800 West Cummings Park, Suite 2900, Woburn, MA 01801, 617-938-7711.

Macintosh II 1-bit Monochrome Video Card
A 1-bit NuBus-compatible video card for the Apple High-Resolution Monochrome Monitor, this is an economical, high-quality interface for users of all computers in the Mac II family. $199. Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014, 408-996-1010.

ColorCapture
(for the IBM)
The first color frame-grabber board for the IBM PS/2 MCA models, ColorCapture brings videographics applications to the PS/2 platform. The board captures 16-bit color images from any RGB video source in real time and displays them on high quality RGB video monitors or on the PS/2 monitor. Using DOS-based graphics applications software, the captured images can be manipulated or combined with text and recorded to video tape or saved to disk. $3495 for the board and software. Data Translation, 100 Locke Drive, Marlboro, MA 01752, 508-481-3700.

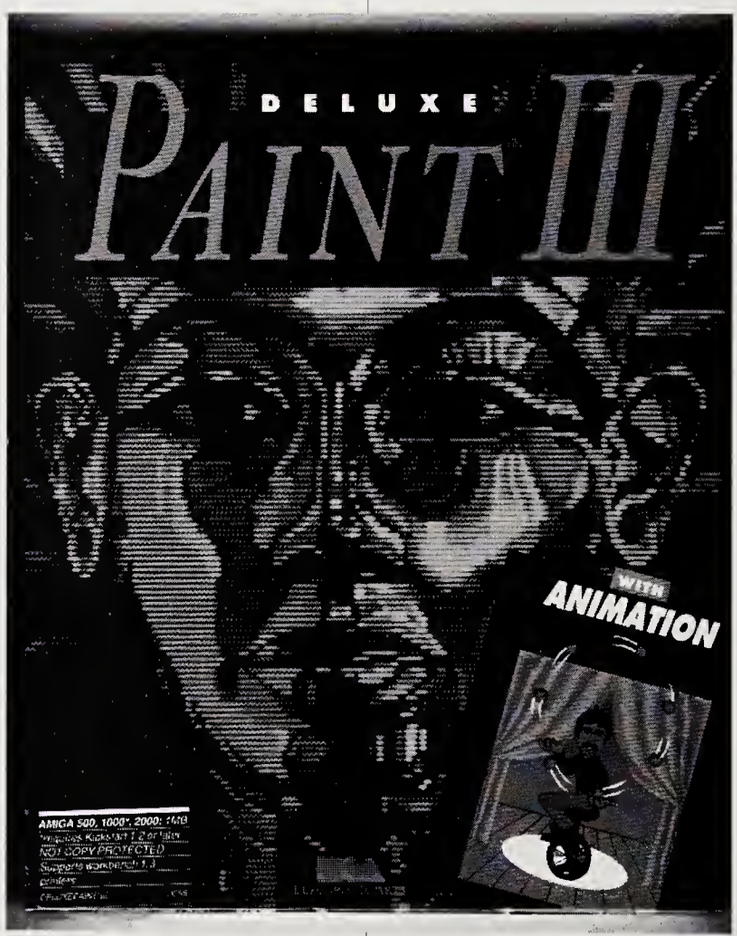
DeluxePaint III — Paint with Animation
(for the Amiga)
DeluxePaint III is a professional-quality graphics tool that allows users to animation-paint a series of screens in the same way they would normally paint a single screen. Users can also create and paint with multiframe Animated Brushes, or integrate animation with the program's Perspective capability in a feature called Move. In Move, a user defines a brush, a distance for it to travel (in any of three dimensions), a rotation (about any of three axis), and the number of animation frames to draw the movement across. $149. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, 415-571-7171.

Studio 1 (for the Mac)

This new package integrates pixelated painting with easy animation. It provides the tools and special effects of Studio 8 (see *Verbum 2.3*) along with direct Apple Scanner control, automatic 3D perspective and a text layer that allows high-quality PostScript text over bitmapped graphics. Studio 1 is an ideal environment for creating animation for HyperCard. Its Animpaint feature allows painting over several frames. Anim Move integrates animation with perspective capability, so the user can define a brush (which could be an object or a full frame and then specify a distance for it to travel (in any or all of the three axes) and the number of frames to accomplish the trip. This seems to be an excellent package for creating lively desktop presentations. $149.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, 415-571-7171.

Dimensions Presenter
(for the Mac)
Dimensions Presenter creates 3D images and animation. Its interface module accepts a variety of input formats; the imaging module provides tools like positioning, cropping, lighting and special effects for both still and animated imaging, with a display module for high-quality printer and film recorder output. A palette of over 16 million colors, multiple light sources and smooth-edged shading are available on the surface modeler. $495. Visual Information Development, Inc., 16309 Doublegrove, La Puente, CA 91744, 818-918-8834.

ScreenRecorder
(for the Mac)
Suppose you want to create a Guided Tour of a procedure or product; ScreenRecorder lets you record all activity on a Mac screen, creating "tapes" that can be played back and sent to other locations via E-mail, modem or disk. The capability of having tapes loop continuously until stopped is useful for creating demos, and they can be incorporated into and played back from a HyperCard stack. The tapes are not self-running



NEOTECH IMAGE GRABBER

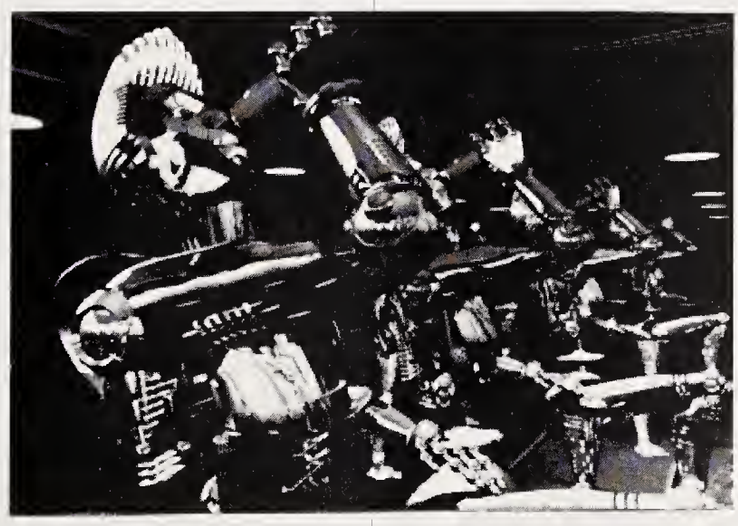
applications, but once incorporated into a HyperCard stack, they require only HyperCard for playback at any location. $195. Farallon Computing, 2210 Dwight Way, Berkeley, CA 94704, 415-849-2331.

Neotech Image Grabbers
(for the Mac SE, II and IIx)
All Neotech grabbers capture images from standard NTCS video sources (video cameras, camcorders, VCRs and video disk players) and digitize them in 256 shades of gray in "real time" (30 frames per second) at a resolution of 640 x 480. Tonal values may be enhanced using any of several filters, and special effects such as posterizing and flashing are also supported for both screen display and printed output. The Image Grabber can be accessed directly (via provided plug-in software modules) from Letraset's *Image Studio* and Silicon Beach Software's *Digital Darkroom*, and it supports a wide variety of file formats for saving images for use with virtually any desktop publishing or graphics software. SE-Bus, $1249; NuBus, $1499. Advent Computer Products, Inc., 449 Santa Fe Drive, Encinitas, CA 92024, 619-942-8456.

Computer Dreams
This video about computer animation encompasses synthetic computer actors, flying sharks, soft-drink guzzling robots and an underwater love affair between a bird and a fish in an hour-long demonstration of behind-the-scenes computer animation. Included are "Stanley and Stella," "Symbolics," "Hawaiian Punch" and the "Gold Series," among other works of scientific visualization, art, medicine, cartoons, space research, human motion, commercials and music videos. Available from video stores, $19.95. Digital Vision Entertainment, 7080 Hollywood Blvd., Suite 901, Los Angeles, CA 90028, 213-462-3790.

3D MODELLING

Super 3D Version 2.0
(for the Mac)
New features include a dithering technique that can display as many as 16,000 colors to permit highly realistic color shading of the 3D models, which can be lit with up to four light sources, each independently adjustable for direction and intensity. 2D PICT images can now be imported and manipulated as if they had been created within the program, and Super 3D exports images as PICT or EPS files for use in other programs. Animation is easier with "tweening" of user-specified frames, and animations can be exported in PICS format. This new version takes full advantage of the 68881 and 68882 math coprocessors for increased speed and accuracy in rendering. $495. Silicon Beach Software, 9770 Carroll Center Road, Suite J, San Diego, CA 92126, 619-695-6956.



COMPUTER DREAMS

Pro3D Photo Finish
(for the Mac and IBM)
As graphics products go, this one covers several bases: it lets you create brand new 3D artwork, incorporate 3D clip art (see "Clip 3D" in this "3D" listing) and combine both with text and imported picture files; it includes a collection of over 1200 full-color, true 3D clip art images, and lets you transform the "faceted" 3D artwork into smooth, photorealistic images. Photo Finish gives access to a host of special features, including smooth, matte, plastic, ceramic or metal finishes, transparency and semi-transparency, reflection of surrounding environments, shadows and colored lighting. $1995. Enabling Technologies, 600 South Dearborn Street, Suite 1304, Chicago, IL 60605, 800-544-0629.

GridMaker
(for the Mac)
This perspective grid construction set uses a traditional reference frame approach, as opposed to an engineered approach, to perspective drawing. GridMaker simplifies the design proc-

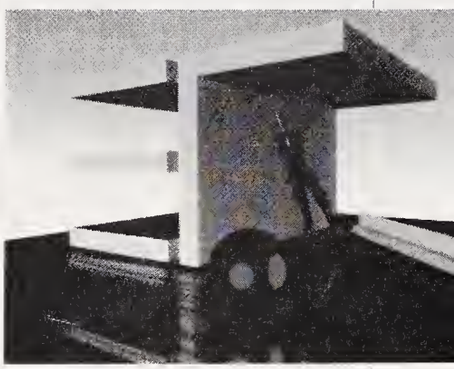


PHOTO FINISH

ess by making use of the scroll bars for changing the roll, yaw and pitch controls of the on-screen object, as well as moving the object within the window. Refreshes, even under MultiFinder on a Mac Plus, happen immediately. $49. Folkstone Design Inc., Box 44 Grantham's Landing, B.C., Canada V0N 1X0, 604-886-4502.

enVision 3D
(for Mac II and SE/30)
Rendering modes include ray tracing, so designs can be made from predefined material like copper, glass or plastic. For presentation graphics, the user can set the desired colors, lighting and camera angle for pie, bar or area charts, and output rendered images to film and PostScript printers. Effects like reflection, transparency, refraction and shadows contribute to the program's image-creating capabilities. $495 Strata Inc., 249 East Tabernacle, Suite 201, St. George, UT 84770, 801-628-5218.

2D GRAPHICS

Chart Illustrator
(for the Mac)
This new HyperCard stack promises to speed the creation of publication-quality graphs and pie, bar and line charts in Adobe Illustrator and Aldus FreeHand. Users enter or paste labels and numbers into the stack and select parameters like bar width and pie chart diameter. The utility then generates a file in a format (Adobe Illustrator

version 1.1) that current versions of the Adobe and Aldus PostScript illustration programs open directly. With the automatic creation of a basic chart file, designers are free to concentrate on details like color selection, typography and special effects. The PostScript feature offers superior resolution, process-color separations and effects such as fillable paths. $89. Maximum Use Software, P.O. Box 4929, Mount Airy Station, Philadelphia, PA 19119, 215-438-8825.

ColorStudio
(for the Mac)
A 32-bit imaging program built upon the grayscale ImageStudio, ColorStudio lets users adjust CMY colors within a selection or throughout an image, globally or within a defined value range. With the color palette users can save custom colors and mix them as though with a brush, or copy color swatches directly from an image. The program's masking feature uses 256 levels of transparency/opacity, and allows for sophisticated color image assembly and manipulation. ColorStudio allows several files to be open at once, each with its own memory configuration and separate Undo capability. Available in late 1989, no price established. Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653, 201-845-6100.

Micrografx Designer 2.0
(for the IBM)
The new version adds compatibility with the OS/2 Presentation Manager, automatic gradient fills, autotrace, Bezier curve editing, a new freehand tool, spot color and process color separations, import and export filters for PCX, TIFF, CGM and DXF, context-sensitive help and more. $695. Micrografx, Inc., 1303 Arapaho, Richardson, TX 75081, 214-234-1769.

Cricket DrawMaster
(for the Mac)
This PostScript-based application surpasses Cricket Draw with features and enhancements like ease-of-use, speed, full Bezier implementation, full color support and access to PostScript effects. Drawings can be created with familiar object-based drawing tools like line, oval and arc, and any object can be transformed into a Bezier path segment for fine-tuning. Traditional objects can be intermixed with Bezier paths for heightened drawing accuracy without working in an all-Bezier drawing environment. $295. Cricket Software, Great Valley Corporate Center, 40 Valley Stream Parkway, Malvern, PA 19355, 215-251-9890.

CLIP ART

Volume One: Art Nouveau Images
(for the Mac)
These high-quality EPS-format images were created using Adobe Illustrator 88, based on copyright-free designs originally published at the turn of the century. The original portfolio has been expanded to 12 complex images occupying over 1.5 MB on two 800K floppies. Art Nouveau Images requires the use of an Adobe EPS format–compatible program like Adobe Illustrator 88, Aldus FreeHand, PageMaker, ReadySetGo! or QuarkXPress. $79.95. Silicon Designs, P.O. Box 2234, Orinda, CA 94563-6634, 415-254-1460.

DIGITIZING
SCANNING AND IMAGE EDITING

Picture Publisher
(for the IBM)
A unique feature of Picture Publisher, the "Astral Picture Window," allows the display of 64 and the manipulation

SILICON DESIGNS ART NOUVEAU IMAGES

Clip 3D (for IBM and Mac)

Reviewed by Tony Reveaux

Enabling Technologies' Clip 3D library of 1200 EPS 3D color clip art images is available in eight volumes, published in both Macintosh and PC/Windows versions. Each volume comes with the Clip 3D application, which is a stripped-down version of Enabling's Pro3D three-dimensional drawing program, and a guided tour. Clip 3D has all of the Pro3D manipulative functions, but lacks its full creation features such as the lathe and profiler tools. With Clip 3D you can create solid primitives such as spheres, a cube or a wedge, merge elements and do basic construction. The files can be translated into Paint, PICT, TIFF or EPS format.

The images range from simple cutout silhouettes to faceted, solid-model figures that pop their polygons. If you're into the crash-dummy look, the people images can be used as is without calling in a stylist. Most of the categories use layered, "jigsawed"planes in various degrees of complexity. For instance, the barbecue grille is spatially sophisticated, while the cookie-cutter animals look like Lucky Charms. As a group, Clip 3D's layercake forms, painted with frosting-rich colors, are stylistically reminiscent of late-40s/early-50s Post-Deco modernism. The **Fonts** album is the collection most valuable for desktop publishing and presentations. There are five faces: headline, modern, beveled, block and classic. The sets are fully international, with pound symbols, cedillas, umlauts, and haceks. **Messages** offers clusters of ready-mades such as "Valentines," "Christmas," "notice," "TGIF," "classified" and "next issue." It has a series of Years from 1980 to HALtime (2001), the Months, and Personals such as "good

luck" and "thanks." **Accents** has all the elements needed for 3D charts and graphs: arrows, links, arcs, borders and other basic forms that can come in handy for building things. The **Dingbats** has anchor, necktie, hammer and sickle, moon, quill and a jack-in-the-box, for example. The **Geography** volume is a very complete atlas with continents, all the countries from Afghanistan to Zimbabwe, the U.S. states, 24 cities and four different 3D globes. People includes "Real" figures which — though solidly modeled — are less than photorealistic, and also Block and Stick figures, at more simplified levels of detail. The **Jigsawed** folder is a Gumby-land of figures representing icons such as fireman, judge, lunch, thinker, and woman at a desk. **Lifestyle** is a visual department store full of images: appliances, tools, housewares, furniture, personal items, and then food, flora and fauna that tend to be more decorative than the hardware items. There are holidays and weather chart elements as well. **Recreation** is heaviest on sports and games, and also includes elements drawn from photography, graphic arts, music and theater. **Business** offers Wall Street icons and symbols, office subjects, a wide range of trades and technologies, and then iconic figures for demographics stamped from the same dies as the jigsawed People. In series of elements like the years in Messages, the Enablers have chosen to vary the style, angle, and colors of each one rather than providing evenly matched sets. That philosophy favors the working environment of a production department that can appreciate having built-in/drop-in variety with less design time. But the artist who needs all the names of the months to match may grumble at having to rebend, edit and recolor 11 out of 12 for overall consistency.

Compared to the photorealistic color images that can be supported on platforms like the Personal Iris or Sun-3/80GX, the Clip 3Ds are primitive, boxy chunkoids that take a yawn-and-a-half to redraw. But they deliver about as much raw, pictorial 3D material as the present Macintosh can process. Like the gearshifting for a foreign truck, Clip 3D is easy to work with once you get used to the pattern. Its intuitive interface gives you a responsive, two-fisted grip to freely rotate, scale and distort objects that — if they were more developed — would be more difficult to process. On a 2 MB Macintosh II, Clip 3D performs quite adequately to be displayed on a SuperMac 19" Trinitron monitor driven by a Spectrum/8 Series II card, for example.

The documentation, in two booklets for the Guided Tour and for Reference, provide solid and well-rendered information. Each volume of two or three disks includes a page with folder and file listings of the images they contain. But there is no pictorial printout of the shapes — a common feature in clip art packages — which would speed up the cruising and choosing. (A representative at Enabling says they're preparing just such a supplement to the documentation, and it should be available by the time you read this.) $99 per volume, or $633.60 for all eight volumes. Enabling Technologies, Inc., 600 S. Dearborn, Suite.1304, Chicago, IL 60605, (312) 427-0408.

of up to 256 levels of grey. The software accepts images in TIFF, and can save images as either grayscale TIFF or EPS. Another original capability is the "Astral Image Cache," which permits users to edit any picture of any size or resolution, or edit several images simultaneously, regardless of the memory resources of their systems. The software will be bundled with Microtek's line of grayscale desktop scanners. $595. Astral Development Corporation, Londonderry Square, Suite 112, Londonderry, NH 03053, 603-432-6800.

ThunderScan Version 5.0
(for the Mac)
The ThunderScan scanner is a cartridge that replaces the ribbon cartridge in a standard ImageWriter, turning it into an image reader. Enhancements to this latest version include support of the handheld LightningScan unit, a halftoning algorithm called diffusion that more faithfully represents gray on a black-and-white monitor and another algorithm that enhances ThunderScan's treatment of edges, producing better bitmap images. Version 5.0 lets users save selected portions of an image as a separate file and load TIFF files created by ThunderScan back into ThunderScan. The new software is now being bundled with ThunderScan and LightningScan. $20 (to registered users). Thunderware, Inc., 21 Orinda Way, Orinda, CA 94563, 415-254-6581.

LightningScan
(for the Mac Plus, SE and Mac II)
This new hand-held scanner transfers images up to 4 inches wide into a compatible Mac. It connects to any Macintosh SCSI port through a supplied controller, rolls across the image and immediately displays it on the Mac's screen. Scanning resolutions are 100, 200, 300 and 400 dpi. LightningScan supports three unique dithering patterns as well as a line art mode, and it supports TIFF, EPS, PICT and Paint file formats. Lightning Scan images are fully compatible with PageMaker, Illustrator, FreeHand, Digital Darkroom, ImageStudio, XPress and ReadySetGo!, among other applications. $549. Thunderware, Inc., 21 Orinda Way, Orinda, CA 94563, 415-254-6581.

LIGHTNING SCAN

SpectreScan I
This is a universal operating software interface program for high-resolution color input scanning devices that allows users to preview color and black-and-white scans, write arbitrary files sizes, do simplified and accurate focus adjustments, zoom and crop the image and adjust for color balance and exposure settings. Adjustments can be done with low-resolution screen scans and applied to high-resolution disk scans. $4995. Pre-Press Technologies, 543 Encinitas Boulevard, Suite 114, Encinitas, CA 92024, 619-753-0194.

ColorKit
(for the Mac II)
ColorKit is software that works with QuickCapture, the 256-gray-level frame grabber board for the Mac II, to capture, display and store images with full 24-bit color. The program follows the standard Mac interface of pull-down menus and icons. It's compatible with PhotoMac, PixelPaint and Studio/8, supports PICT2 and TIFF-24 file formats and captures images in less than one second. $295. Data Translation, 100 Locke Drive, Marlboro, MA 01752, 508-481-3700.

PRE-PRESS

Open Pre-press Interface
(for the Mac)
Announced at Seybold Seminars in March, Aldus's set of PostScript-language comments, OPI, lets pre-press systems electronically incorporate high-resolution color images into desktop-produced publications. So far it's been endorsed by such pre-press

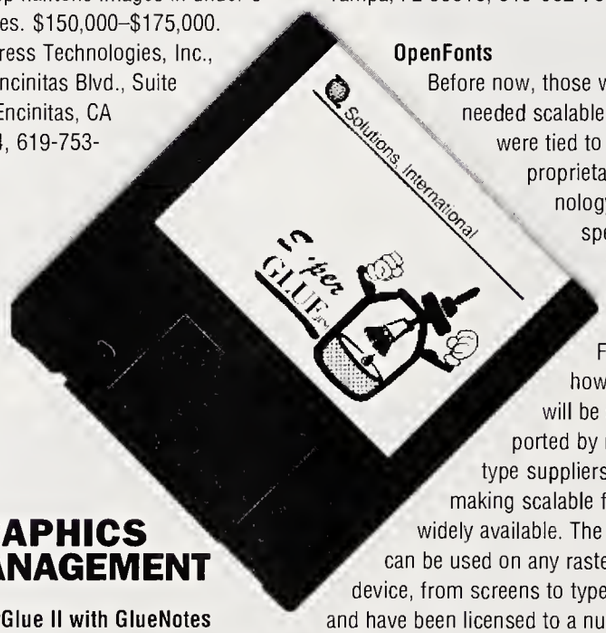
vendors as Crosfield, Diadem, Dainippon Screen (DS America) and PrePress Technologies, and speculation is that OPI could become an industry standard, linking desktop publishing to high-end color pre-press systems. The pre-press system reads the PostScript file for the OPI image comments, lists the file names of the scanned images and records the accompanying sizing, positioning and cropping information. Then it uses the OPI comments to locate the TIFF files and electronically strip the high-resolution image into the publication. The OPI PostScript comments can easily be adopted by any program or system. Aldus Corporation, 411 First Avenue South, Seattle, WA 98104, 206-628-2352.

PageMaker Color Extension
(for the Mac)
With this package users can color text and PageMaker-drawn graphics, or import color illustrations saved as EPS files. PageMaker Color Extension offers four options for output: color printers, black & white laser printers, PostScript-language imagesetters and high-end pre-press systems that produce four-color separations of documents containing TIFF images through separation software and OPI. The program supports the full palette of PANTONE colors, as well as the industry-standard HLS, RGB and CMYK. $195. Aldus Corporation, 411 First Avenue South, Seattle WA 98104, 206-628-2352.

ASDG-RESEP
(for the Commodore-Amiga)
ASDG-RESEP is a conversion utility for use in conjunction with a page composition system: Professional Page, Professional ScanLab, a Commodore-Amiga 2000 and a JX-300 or JX-450 color scanner. The program will automatically insert 24-bit color scanned images (using Professional ScanLab) into PostScript color separations (generated in Professional Page) for professional-quality color magazine publishing. $55.95. ASDG Inc., 925 Stewart St., Madison, WI 53713, 608-273-6585.

SpectreMatch/Print II
This system allows graphic artists and professional color separators to color-correct and separate high-resolution true-color images and generate output for PostScript laser imagesetters. RGB components are converted to YMCK with interactive controls for full color correction, separation, gradation and unsharp masking. The artist can switch between a two-window screen and a four-window screen, each of which contains a version of the down-sampled image. $9,995. Pre-Press Technologies, 543 Encinitas Boulevard, Suite 114, Encinitas, CA 92024, 619-753-0194.

SpectreSetter
A high-speed laser image-setting device, SpectreSetter offers precision and compatibility in producing halftone film separations for quality color work. The embedded RIP processes PostScript files, as well as DDES, Handshake, InterScript and CCITT Group 4. With 120 pica output width and 2000 dpi resolution, the device plots a 26-inch and 20-inch film separate of broadsheet, tabloid or four-up halftone images in under 3 minutes. $150,000–$175,000. Pre-Press Technologies, Inc., 543 Encinitas Blvd., Suite 114, Encinitas, CA 92024, 619-753-0194.



GRAPHICS MANAGEMENT

SuperGlue II with GlueNotes
(for the Mac)
This new version of the "print to disk" utility includes the electronic equivalent of Post-it notes that can be attached to Glue-format files. GlueNotes captures data that normally would go to a printer and saves it on disk. By using the free GlueViewer application, a recipient can open and view the resulting electronic printout, print it on paper or integrate it with other Mac programs. The SuperViewer adds comments or graphics in attached GlueNotes, extracts text from the file or substitutes other fonts for those in the original document. $119.95. Solutions International, 30 Commerce Street, Williston, VT 05495-9957, 802-658-5506.

FONTS AND TYPE

LetrTuck
(for the Mac)
The first Mac program that lets you add, delete or modify kerned pairs in the System fonts, LetrTuck provides a quick, easy way to create and adjust kerned-pair tables. The program still has a few bugs to be worked out, however; it refuses to store kerning values entered from the keyboard or to print samples of any pair beginning with an apostrophe, and it doesn't work with MultiFinder. Saving and storing can be a frustrating experience, and the manual is often unclear. Nevertheless, LetrTuck should prove a useful utility for the serious desktop publisher. $149. EDCO Services, 12410 N. Dale Mabry Highway, Tampa, FL 33618, 813-962-7800

OpenFonts
Before now, those who needed scalable fonts were tied to the proprietary technology of specific vendors. OpenFonts, however, will be supported by many type suppliers, making scalable fonts widely available. The fonts can be used on any raster device, from screens to typesetters, and have been licensed to a number of leading type vendors and design studios, including Linotype, Monotype, Berthold and Bigelow & Holmes. Sun expects that within a year more than 700 brand-name typefaces will be available to end-users and developers, among them Palatino, Helvetica and Times Roman from Linotype, and Monotype's Bembo, Gill Sans and Rockwell. Sun Microsystems, Inc., 2550 Garcia Avenue, Mountain View, CA 94043, 415-960-1300.

EXPANSION AND STORAGE

Dual Serial Board
(for the Amiga 2000)
This hardware-software combination is a dedicated board composed of two AT-compatible 9-pin D connectors that lets you simultaneously plug into more than one serial device. It occupies a single expansion slot on the A-2000 motherboard and does not prevent the function of the original built-in serial port. It comes with a high-speed, fully compatible driver and a handler and public domain software, letting you put extra serial ports to immediate use. $299. ASDG, 925 Stewart Street, Madison, WI 53713, 608-273-6585.

The Genesis GS600
(for the Mac)
This latest edition to the Genesis series of internal hard drives is a rewritable optical disk system, designed to give the convenience of a floppy, the speed of a hard disk and the durability and reliability of a compact disk. It has a formatted capacity of 595.2 MB and an average access time of less than 50 msec, and it can transfer data at the rate of 1.2 MB per second. $4995. MACsetra Technologies International Inc., 2237 York Avenue, Saskatoon, SK S7J 1H9, Canada, 306-955-0002.

Macintosh 160SC Hard Disk
(for the Mac)
This 160MB, 5.25-inch hard disk is available as an internal unit for the Mac II or IIX, or as an external unit for any Mac with a SCSI port. It functions as the ideal solution for file server, A/UX and other applications requiring a high-capacity, high-performance hard disk. $2599. Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014, 408-996-1010.

VIRTUAL
(for the Mac SE/30, II and IIx)
By putting information normally stored in RAM on your hard disk and retrieving it transparently as required, this software allows you to run

several "memory hogs" concurrently under MultiFinder, so you can take full advantage of the Mac operating system's 8MB capacity without the expense of memory chips. $295 ($695 for Mac II's). Connectix Corp., 125 Constitution Drive, Menlo Park, CA 94025, 415-324-0727.

PLATFORMS

DynaBook
(for the IBM)
A portable IBM PC/AT-compatible computer with an integrated CD-ROM drive and detachable touch screen, DynaBook is unique in integrating three new technologies: CD-ROM, Surface Acoustic Wave (SAW) touch-screen technology and the "Double-Super twist" LCD (page-white) display panel. It runs MS Windows, Lotus 1-2-3 and other standard PC programs and, because it's portable, can deliver large amounts of text , photos and graphics to courtrooms, factory floors, hospital rooms, airplane cockpits, on sales calls and anywhere else that standard desktop CD-ROM systems are not workable. The high-contrast, high-resolution display is designed to help eliminate the eye strain that can result from viewing the vast amounts of material a CD-ROM disk can store. $4995. Scenario, Inc., 260 Franklin Street, fifth floor, Boston, MA 02110, 617-439-6611.

MetaBook Software Development Kit
(for the IBM)
This kit provides programmers with the tools to develop sophisticated end-user interfaces that take advantage of DynaBook's detachable touch screen as an alternative input device. Included is a toolkit for building touch-screen applications or modifying traditional keyboard-driven CD-ROM applications for use with the touch screen, and a Scenario Window Manager. The Window Manager us a device-independent, royalty-free windowing system providing a comprehensive set of tools for constructing multiwindowed touch-screen applications. $495. Scenario, Inc., 260 Franklin Street, fifth floor, Boston, MA 02110, 617-439-6611.

COMMUNICATION

Mac2400E
(for the Mac II)
An error-correcting internal modem, this 2400 bps unit does more than eliminate external cords and cables. The Mac2400E implements both X.PC and MNP levels 2,.3 and 4 error-correction protocols, and users can activate or switch between X.PC and MNP with a single keystroke. This new modem also supports MNP level 5, which offers the additional benefit of automatic data compression. The user can double throughput to 4800 bps, resulting in less time spent transmitting data and reduced tele-phone charges. $449. Ven-Tel, Inc., 2121 Zanker Road, San Jose, CA 95131, 408-436-7400 or 800-538-5121.

BackFAX
(for the Mac with AppleFax)
BackFAX is the only FAX communications software for the Mac and AppleFax modem that operates in the background, meaning it can send or receive FAX documents while another application is running. It comes in handy for sending documents directly off the Mac to any Group 3 FAX machine, as well as copying parts of documents received via the AppleFax modem for pasting into other Mac applications. BackFAX saves frequently used FAX numbers with delivery instructions, and can operate automatically to delay sending FAX documents until a later time. $245. Solutions International, 30 Commerce St., Williston, VT 05495, 802-658-5506.

DISPLAY OPTIONS

Apple 21-inch Two-Page Monochrome Monitor and **15-inch Apple Macintosh Portrait Display**
(for the Mac II)
Both monitors display text and graphics, including menus and scroll bars, and use a flatter screen to reduce the distortion typically found at the edge of large monitors. An anti-glare coating on the screen diffuses ambient light for a reflection-free user interface. The Two-Page Monochrome Monitor features 1152-by-870 resolution, displaying images, text and graphics at 77 dpi, and boasts a 75Hz refresh rate. The Portrait Display also refreshes at 75Hz, and includes three ADB connector inputs with two-meter video and power cables for flexibility in customizing the working environment. Two-Page Monochrome Monitor, $2149; companion video card, $599. Portrait Display, $1099; companion video card, $599. Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014, 408-996-1010.

Vision '030A and Publisher '030
(for the Mac SE/30)
The 8-bit Vision '030A is nearly $1000 less expensive than other boards for the SE/30, and it's the first that can drive Apple's 13-inch color display. The '030A offers a resolution of 640 by 480 pixels at 72 dpi, supporting 1-, 2-, 4- and 8-bit color and gray levels. Hardware-based pan and zoom functions let users move quickly across a virtual desktop of 820 by 480 pixels. Publisher '030, a monochrome board, is the first board for the SE/30 that will drive Apple's new 15-inch display and 21-inch landscape monitor. It provides resolution of up to 1024 by 768 pixels at 72 dpi and, with the Apple portrait monitor, will provide a full-page virtual desktop and pan and zoom functions. Vision '030A, $995; Publisher '030, $525. Generation X Technologies, 3350 Scott Road, Building 7, Santa Clara, CA 95054, 408-739-4570.

RasterOps ColorBoards
All three new boards introduced by RasterOps — a 24-bit upgrade board, a 24-bit ColorBoard and a 32-bit ColorBoard — operate under Apple's new "Full Chunky" implementation of 32-bit QuickDraw. Since the 32-bit QuickDraw standard consists of 24 bits of color and 8 bits of "alpha channel," RasterOps' 24-bit boards use 24 of the bits for color, while the 32-bit boards support the alpha channel. ColorBoard 224 operates in 1-, 2-, 4-, 8- and 24-bit modes at either 800 x 600 pixel resolution on a 16-inch monitor or 1024-by-768 pixel resolution on a 19-inch monitor. ColorBoard 232 offers up to 32-bit modes and works with 13-inch monitors at 640-by-480 pixel resolution. ColorBoard 124 is a full chunky upgrade for the company's 24-bit chunky planar ColorBoard 104. ColorBoard 224, $5195; ColorBoard 232, $3995; ColorBoard 124, $4995. RasterOps Corporation, 10161 Bubb Rd., Cupertino, CA 95014, 408-446-4090.

Mac 'n Touch Snap-on Kit
(for the Mac SE)
This lowest cost touch screen in the Mac 'n Touch line is user-installable, which eliminates dealer retrofitting charges. It plugs into the ADB and runs with all Macintosh software, including HyperCard. The kit has a resolution of 1024-by-1024 touch points, more points than the SE's display. The screen's controller measures the position of a capacitive coupling when a finger or conductive stylus touches the screen. $595. MicroTouch Systems Inc., Ten State Street, Woburn, MA 01801, 617-935-0080.

Kodak LC500 video projector
(for the Mac II)
The first portable, full-color video projector combination for the Mac II, the LC500 requires no convergence and can display output through a variety of add-ons, including Julian Systems external interfaces and video grabber boards with genlock capabilities. Switchable inputs are provided for NTSC composite video, digital RGB signals and analog RGB video. With 320 x 220 pixel resolution in full color, it provides good-looking screen images for computer-generated presentations. $3495. Eastman Kodak Company, 343 State Street, Rochester, NY 14650, 716-724-3169.

MUSIC

Instant Synthesizer
(for the Apple IIGS)
By bringing together the features of a four-voice polysynthesizer, a sound digitizer and a sound editor, Instant Synthesizer expands the number of instruments in existing music programs like Instant Music. The program lets owners of low-end MIDI keyboards and musicians working with sound sampling boards boost their keyboards to the level of high-end equipment by creating many more instruments, capturing live sounds or

Perceive (for the Mac)

Reviewed by Neal Fox

Perceive is an "interactive softext," a phrase that means a combination of software and textbook. The package comes with a textbook on basic music theory, a workbook with exercises that can be torn out and handed in to a teacher, a reference manual, (although the programs are simple enough to figure out without one) and six miniprograms for the Macintosh. The textbook suffers from what all music textbooks suffer from. It's dull. One really nice thing about the textbook, though, is the fact that it starts with some elementary physics. The nature of sound is an important part of today's music, with synthesis and sampling playing such major roles.

But textbooks aside, where Perceive really shines is in ear training. Basically, in an ear-training course the teacher plays a note for reference and then, depending on whether it's a drill for intervals, scales or chords, plays two or more notes in succession. The number of notes and the speed at which they're played determines the level of difficulty. The computer solves the problem of needing a partner to practice. (After all, you can't just play some notes on a piano and then try to guess them, pretending that you don't know what you just played.)

Of the six mini programs that come with Perceive the two main ones are Tutor and Drills. The Tutor program offers study in major and minor scales, modes, pentatonic, whole tone, diminished and chromatic scales. The screen is a piano keyboard and two columns of buttons. You click on the Hear New Example button to hear an example played according to the parameters you've already defined. After hearing it, you play back what you think the notes are by clicking on the corresponding piano notes. If you play a wrong note you can click a button — Erase My Last Note or Erase My Response — and try again. When you feel satisfied with your answer, you click Compare, and your response is compared with the right answer. As you progress, you can make the examples more difficult by increasing the number of notes and the tempo. A record of your work is kept and can be printed for the teacher to track your progress. The music can be played back on the internal speaker, on an external speaker, through headphones (a must for classrooms) or via a MIDI keyboard. The Drills program gives you rapid drilling of scales, triads, intervals and seventh chords, all ascending, descending or simultaneous and all user-customizable. These programs are so flexible and simple that you can go all the way from beginner to very advanced. And you won't need to bury your nose in the manual.

functioning as a drum machine or extra synthesizer. Users can graphically edit the wave form, adjust the attenuation, cut parts of the wave, loop segments and find loop points automatically. $79.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, 415-571-7171.

Avid/1 Media Composer
(for the Mac)
A professional-quality digital video-editing system, this random-access, nonlinear software can handle full-motion color video and two channels of 16-bit CD-quality sound. It's capable of producing frame-accurate work and master prints, and offers editors the full range of editing controls including transition editing, video-style insert editing and film-style splicing. Video footage can be organized in graphical databases with multiple bins each capable of displaying clips as pictures or as edit lists. Users simply edit by moving graphical elements on a time line; for very detailed work, the system can display the actual frames in sequence. Since all the video and audio is stored in digital form, access is immediate. Configurations range from less than $20,000 to about $80,000. Avid Technology Inc., 175 Bedford Street, Burlington, MA 01803, 617-272-1680.

CD-ROM

Compton's MultiMedia Encyclopedia
A networked encyclopedia on computer, this product uses a CD-ROM to offer several workstations simultaneous access to each of more than 5000 Compton's articles, which are enhanced with color, animation and sound. An intelligent search and retrieval system gives users quick access to all the information on the disk. The encyclopedia also offers more than 12,000 images, including maps, charts, graphs and high-resolution photos. Available before September, 1989; pricing to be established. Johnston's Learning Corporation, San Diego, CA, 800-548-8372.

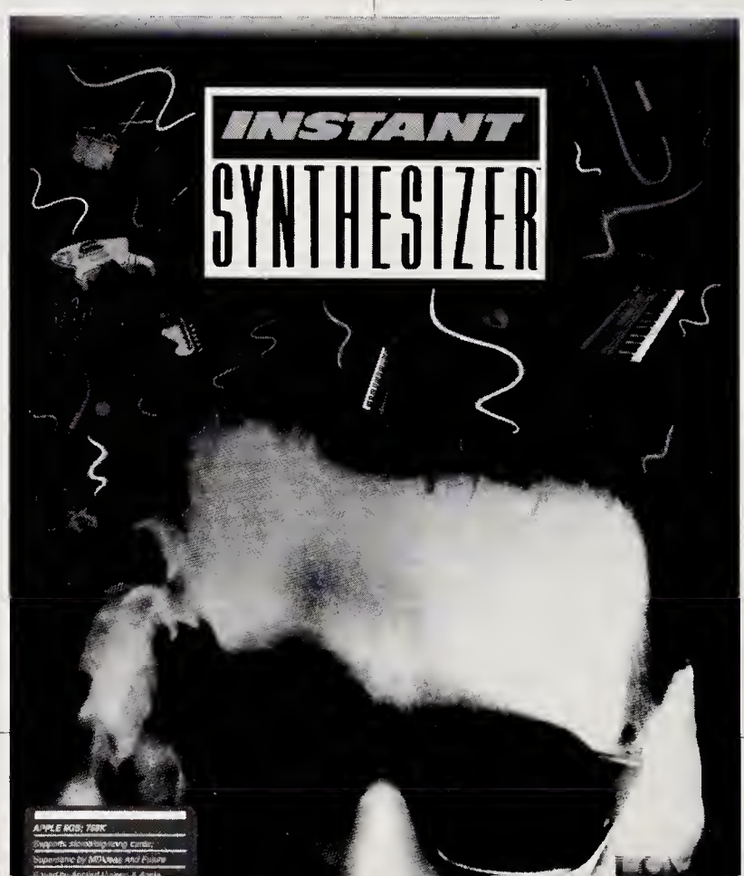
HyperSource CD
(for the Mac)
This CD-ROM compendium incorporates graphics, sound, animation and color with a wealth of information, which it accesses by using HyperCard as a retrieval engine. HyperSource CD is segmented into seven specific areas: Third Party Product Encyclopedia, Interactive Training Modules, Macintosh Product Showcase, Focus On, *Mac-In-Touch Journal,* Index to *Macworld, MacUser*, *MACazine,* and *nibbleMAC,* and a Professional Services Directory. The program has the ability to preview software and hardware for the Mac, as well as learn selected applications and scan the latest news; any stored information can be printed in an organized report. First available in August at Macworld Boston, $129; upgrade opportunities are biannual for $59. HyperSource CD, 174 Douglas Street, Suite 102, Sudbury, Ontario P3E 1G1, Canada, 705-674-8254.

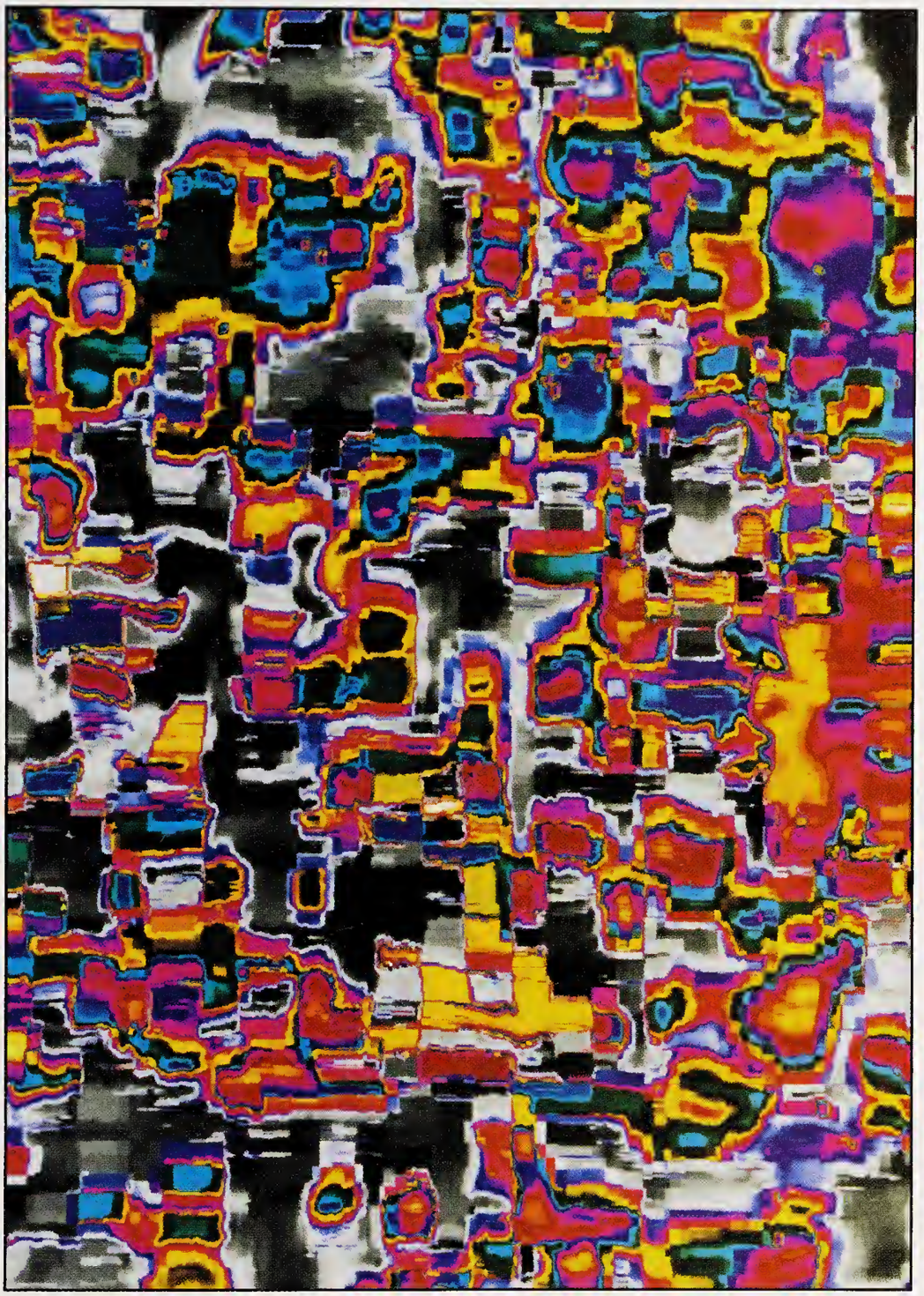
Electronic Whole Earth Catalog
This CD-ROM version of the all-encompassing source book runs under HyperCard and includes sound, so you can actually listen to selections from over 200 recordings. It also includes digitized images and over 2000 graphics, and has been expanded with new material on communications, technology and computing taken from Whole Earth's *Signal* publication and the *Whole Earth Review.* $149.95. Brøderbund Software, Inc., 17 Paul Drive, San Rafael, CA 94903-2101, 800-521-6263.

SOURCES
BOOKS, CATALOGS AND NEWSLETTERS

Expert Advisor: Adobe Illustrator
by Diane Burns, S. Venit and David Smith
A complete reference to the original Adobe Illustrator as well as Adobe Illustrator 88, this book lists all the commands and tools alphabetically. Each entry includes: the name of the tool, an overview of how it works, procedure for proper use in practice,

Continued on page 59

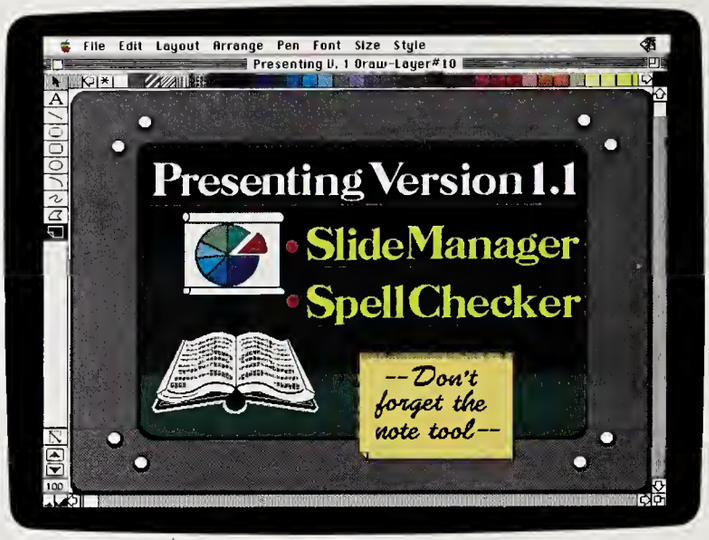


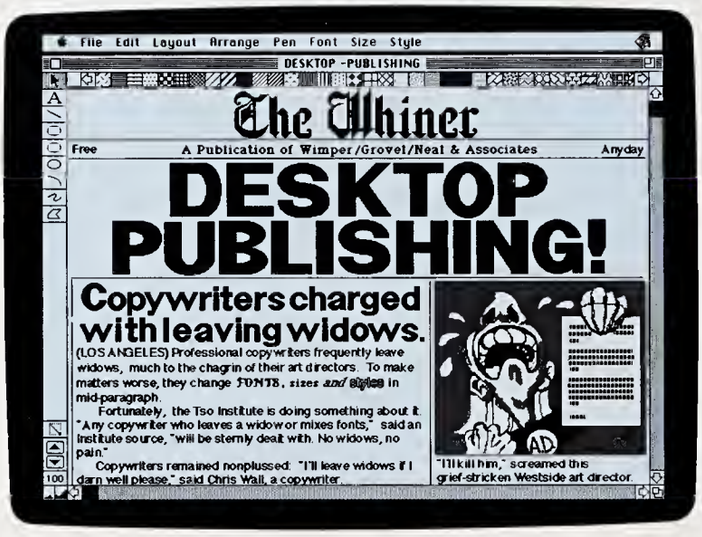


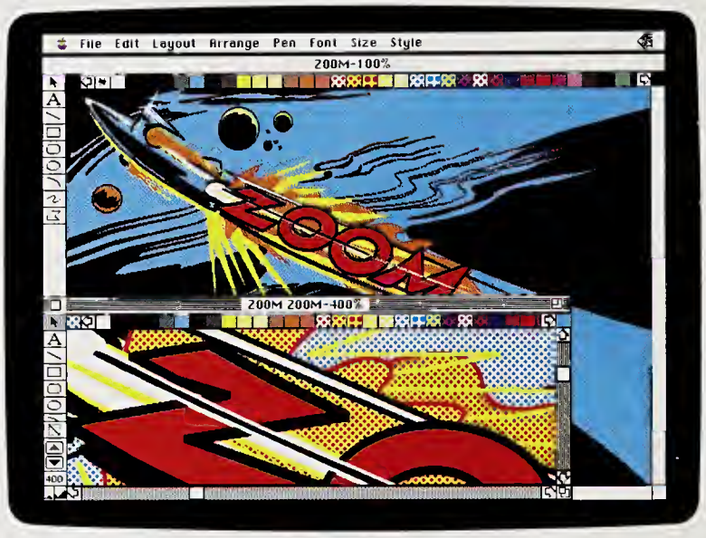
OvalTune™

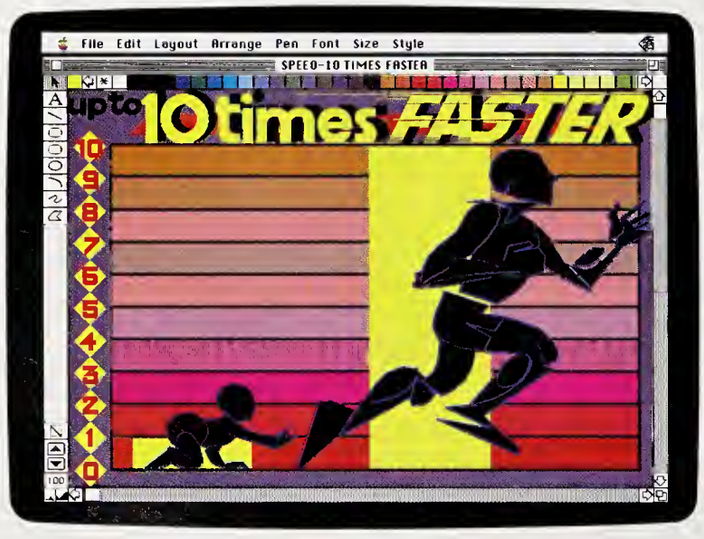
"This is the most powerful image generator I've ever worked with." — Brent Haleen

"Personality" by Brentano Haleen was created with OvalTune, an extraordinary music & graphics software program for the Macintosh from Intelligent Music, 116 North Lake Avenue, Albany, NY 12206. (518) 434-4110




File Edit Layout Arrange Pen Font Size Style
DESKTOP -PUBLISHING
The Whiner
Free
A Publication of Wimper/Grovel/Neal & Associates
Anyday
DESKTOP PUBLISHING!
Copywriters charged with leaving widows.
(LOS ANGELES) Professional copywriters frequently leave widows, much to the chagrin of their art directors. To make matters worse, they change FONTS, sizes and styles in mid-paragraph.
Fortunately, the Tso Institute is doing something about it. "Any copywriter who leaves a widow or mixes fonts," said an Institute source, "will be sternly dealt with. No widows, no pain."
Copywriters remained nonplussed. "I'll leave widows if I darn well please," said Chris Wall, a copywriter.
AD
"I'll kill him," screamed this grief-stricken Westside art director.





*Nobody reads legal type, either But try convincing our lawyers of that. © 1989 Claris Corporation. All rights reserved. 440 Clyde Avenue, Mountain View, CA 94043; **415-962-8946.***
*Claris is a trademark and MacDraw is a registered trademark of Claris Corporation. For the location of the nearest Claris dealer, ca'l **800-3CLARIS, ext. 260.** In Canada, call **800-668-8948.***

Nobody reads copy anyway. MacDraw® II.

CLARIS™

I recently received a copy of your issue #3.1 and had a couple of questions about the article on "Third-Generation Software for Writers" by Michael Rossman. The main question is: Is this article for real or is it a joke? If it's for real, then please provide me with the addresses and phone numbers for the three companies mentioned: Eric Blair Associates, Cosell Corporation and Glib Ink). If it's a joke, then please let your readers in on it.

Even if the companies and their products are only in the imagination of Mr. Rossman, we professional writers could really *use* a product like Chameleon. So, even if Glib Ink is bogus, perhaps somebody really will write such a program. I'd buy it. Thanks.

P. Hopkins

Please see "Look and Feel" on page 24 of this issue. — Ed.

I can't begin to tell you how much I enjoyed the latest issue of *Verbum*! It is, of course, an issue that would appeal to any lover of words and language, but you have truly outdone yourselves!

The range of topics and variety of presentations are outstanding. Add to that impeccable research and obvious attention to editorial and production details. You really do deserve special commendation for a superb issue with appeal to graphic artists, computer programmers, editors, writers and devotees of contemporary journals (the crusaders of independent publishing!): combinations of screens, four-color work, and optional third colors; the unique pagination designs; the savvy use of pull quotes, typefaces and dropped/raised caps — all used to advantage and never *abused* or misplaced; and — for the first time in recent memory — an appropriate, judicious use of shadow boxes (that omnipresent image that has replaced imagination in journals, ads, illustrations, business cards, etc., all over the planet!).

Thank you for an issue that will be read, reread, shared and discussed for months to come. Thanks, too, for your recognition of the essential integration of text and art. One so often encounters the two in competition or opposition.

Brenda Mitchell-Powell
Editor, *Small Press*

We just received and read over *Verbum 3.1*. Very good issue! Steve Hannaford's observations and research in "Faces in the Crowd" are certainly true to many of the comments we have heard throughout the industry.

I would like to make one correction regarding your mention of Family Builder. The utility that is included with Suitcase II is called Font Harmony. Our product, Family Builder is similar, yet a bit more detailed in its use than Font Harmony. Let me know if you would like more info on Family Builder. We generally sell and promote it to professional font designers only.

Ellen M. Townsend, Marketing Director
Altsys Corporation

You have a nice magazine here overall. Only found one typo — "Grammer." Bingo!

The Write Brothers
San Francisco

Bingo, indeed. If you're going to miss something in proofing, we always say, why go halfway? Let it be in a title that has to do with getting the words right, and in the first word in the table of contents. — Ed.

ROLL OVER BEETHOVEN.

LightningScan. Thunderware's hand-held scanner for the Mac. Now with gray scale conversion.

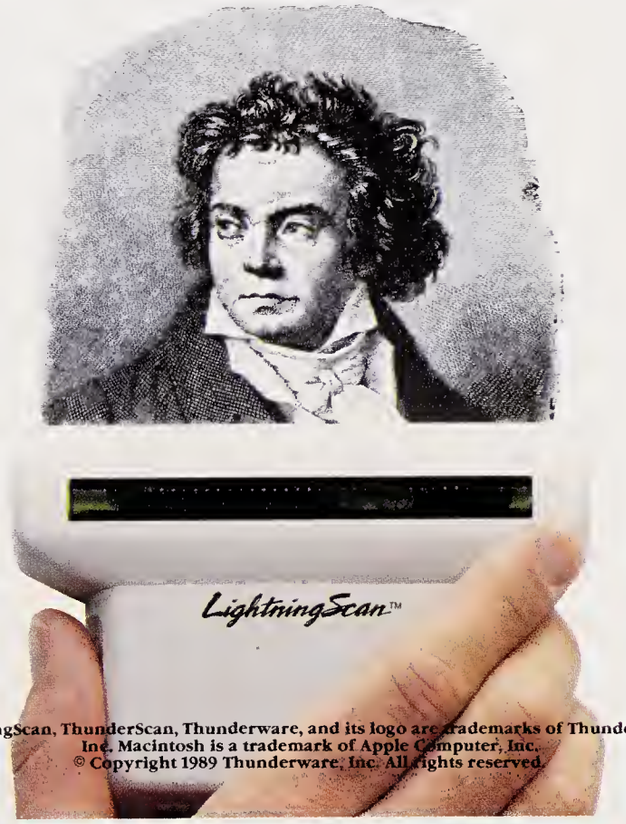
Our new product roll-out is worth a little arm waving. That's because LightningScan lets you scan images up to four inches wide from books, mounted artwork, or anywhere else. You get switchable resolution up to 400 DPI. Software conversion to gray scale. A setting for text and line art. Plus three dither patterns that put limitless special effects right at your fingertips.

LightningScan comes with the application that helped make ThunderScan famous. Along with desk accessory software that works in concert with any Macintosh program. And to end this ad on an upbeat note, LightningScan can be yours for just $549 suggested retail. So get rolling to your dealer and pick one up today.

Thunderware®

LightningScan™ Hand Scanner for Macintosh®

21 Orinda Way, Orinda, CA 94563 415/254-6581 FAX: 415/254-3047



LightningScan, ThunderScan, Thunderware, and its logo are trademarks of Thunderware, Inc. Macintosh is a trademark of Apple Computer, Inc.
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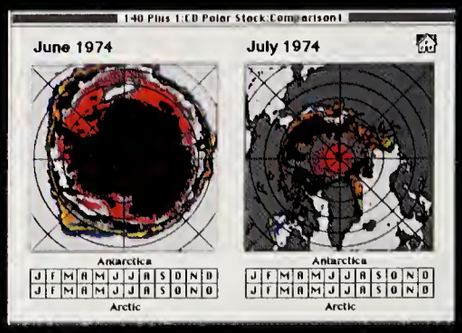
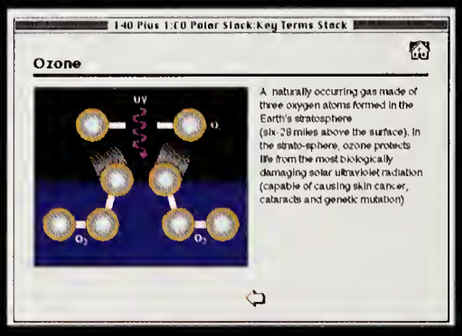
Interactive

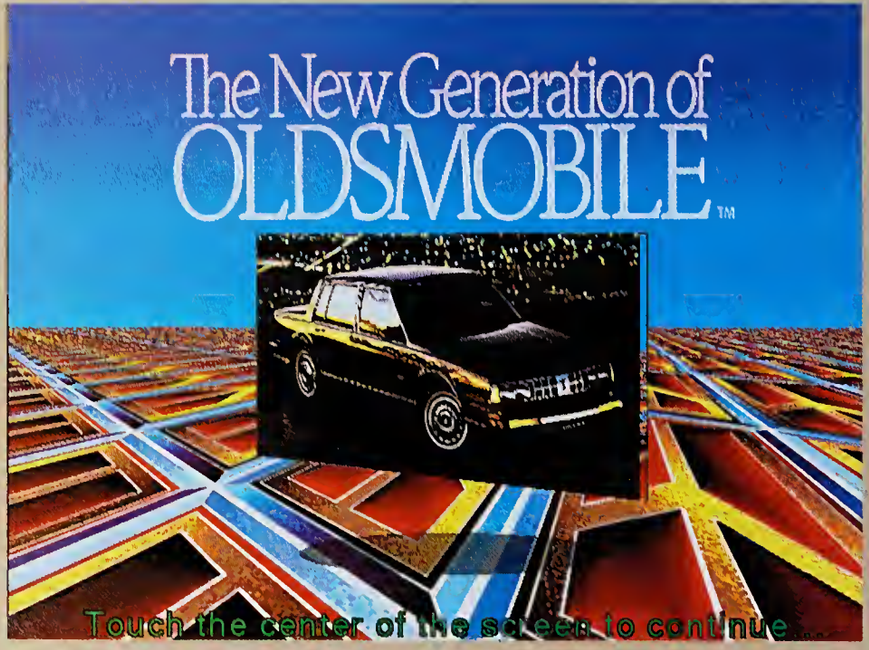
Polar See Ice is a stack based on satellite imagery of the arctic and antarctic regions. Single-frame images, animation, displayed text and original sound are combined to help users understand monthly sea ice cover and annual cycles in the sea ice. The stack has served as a demo for NASA, U.S. Geological Survey and other clients. Says Peyson R. Stevens, president of InterNetwork, Inc., "We felt it was important to develop a piece that would demonstrate some of the aspects of hypermedia within a scientific context." Polar See Ice was constructed with HyperCard 1.2, VideoWorks II and VideoWorks II HyperCard Driver on a Mac II with 5MB of RAM.

140 Plus 1:CD Polar Stack:Arctic
January 1974
January 1974:
Highest concentrations of ice (red-purple) extend from the North Pole to the adjacent seas bordering USSR, Barents Sea, Beaufort Sea, Hudson Bay, etc. The Bering Sea is partially frozen. Tongues of sea ice cover extend southward along Greenland,
PLAY




140 Plus 1:CD Polar Stack:Key Terms Stack
Ozone
UV
O
O2
O3
A naturally occurring gas made of three oxygen atoms formed in the Earth's stratosphere (six-28 miles above the surface). In the strato-sphere, ozone protects life from the most biologically damaging solar ultraviolet radiation (capable of causing skin cancer, cataracts and genetic mutation)

The Oldsmobile Consumer Computer, created by Incredible/I, is a state-of-the-art interactive kiosk designed for trade show use. An animated attract routine brings people to the kiosk. Once someone touches the screen, a two-minute noninteractive animated sequence welcomes them and displays instructions and information about using the system. The interactive portion of the display allows showgoers to see the Oldsmobile line of autos in full color, select a specific model, options and financing terms, and receive a fully detailed sticker with the car's standard equipment, selected options and prices, and a breakdown of term and leasing payments. The entire system was based on a HyperCard shell, using VideoWorks II and VideoWorks II HyperCard Driver. The kiosks themselves were Mac II–based.



All the color screen snapshots on this page were converted to TIFF files using Studio 8. The individual images were then separated by Pre-Press Technologies, Inc. using their SpectrePrint I software. Page makeup was executed in QuarkXpress 2.0. The size of the Xpress file was 321K, the embedded separations totalled 13.4MB. The page was output as negative film at 2540 dpi by Central Graphics.

Artistry

Earth's Polar Sea Ice

■ *by Payson R. Stevens*

As it becomes evident that human impact on the planet has critical consequences, it is essential that all age groups be aware of the Earth as a system. InterNetwork, Inc. designed Polar Sea Ice as a prototype to demonstrate novel applications of information visualization for our clients, such as NASA, who are working in the area of human impact and global change.

Polar Sea Ice is a "work-in-progress," an R&D exploration of a program that will eventually navigate through different Earth data sets (sea ice, ocean color, winds and so on), collected by remote sensing instruments in orbit around the planet.. Our goal is to show how hypermedia might function as a front-end information tool for the scientific dissemination of satellite imagery planned for NASA's "Mission to Planet Earth." Spin-off applications for education at all levels are also planned.

Many of the design concerns involved with hypermedia are very similar to those of book design. The goal in both media is to create a resource that is understandable, comfortable to use and visually exciting. And though we lose the æsthetically pleasing elements of paper color and texture and the refined level of typography, we gain the tools of animation, video, sound, databases and the fourth dimension, time. Hypermedia can accelerate the learning process by visually describing or clarifying relationships that could not easily be communicated by books. The discovery aspect that comes from being able to make our own connections within a body of information also reinforces the educational process.

THE STACK IN ACTION

Polar Sea Ice is a scientific stack based on satellite imagery of the Arctic and Antarctic regions. It shows changes in sea ice concentration during a one-year cycle in both regions. The stack utilizes single-frame images, animation, text and original sound. The main features of the stack include:

- Single-frame images of monthly sea ice cover at each pole
- Animated sequences, showing the 12-month cycle of ice cover
- A comparison of arctic to antarctic sea ice for any single month
- An orientation to the geography affect ing ice formation
- Definitions of key words in the explanation of sea ice cycle phenomena

Continued on page 56

Oldsmobile's Consumer Computer

■ *by David Biedny*

The members of Incredible/Interactivity have spent years looking at the accelerating rate of technical innovation in terms of hardware and applications software, communications, graphics, and the application of human creativity to these areas. It gradually occurred to us that all those powerful tools aren't really being used to their full potential. As industry analysts, writers, musicians, artists and teachers, we decided that it was time for someone to push the creative boundaries of the tools at hand. We believe that what we call multimedia today is simply television as it will look and feel around the turn of the century — we are defining how this new television will work, using today's technology to simulate those future environments. Passive television will always have it's place, but the children of today are becoming accustomed to interacting with television: witness the continuing proliferation of video games. Ask those kids what tomorrow's TV will be like – they already know. And so do we.

The Oldsmobile Consumer Computer is a state-of-the-art interactive kiosk, designed for trade show use. It allows show-goers to see the Oldsmobile line of autos in full color, to select specific models, options and financing terms, and to receive a fully detailed sticker with each car's standard equipment, selected option packages and individual options prices, and a breakdown of term and leasing payments. The system was developed with particular attention to user friendliness and a smooth look and feel that would appeal to the broadest range of prospective consumers.

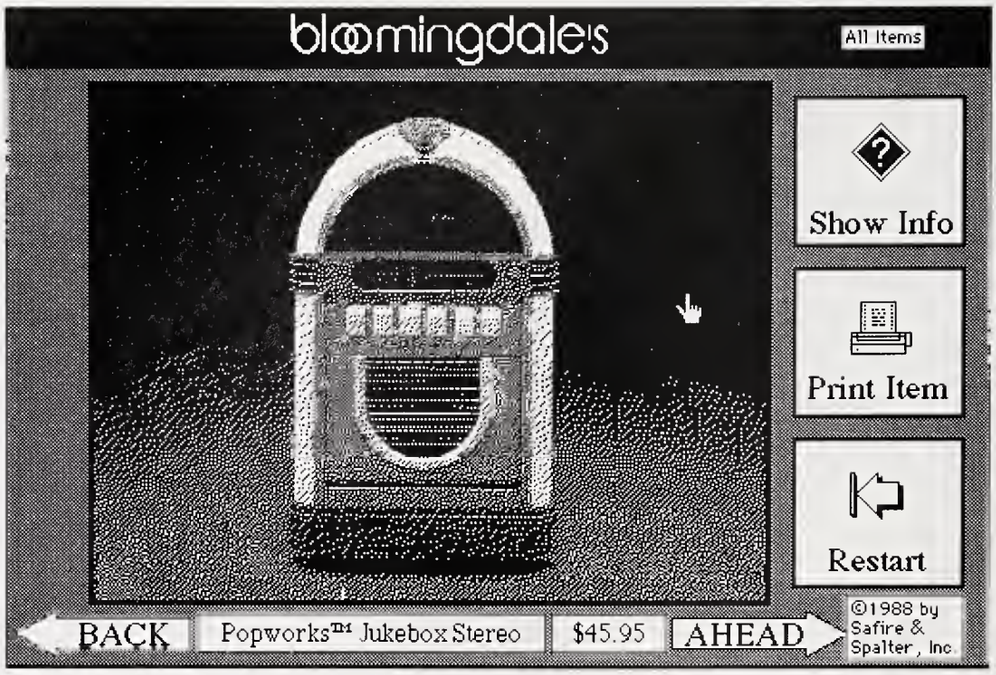
Incredible/Interactivity was approached by Leo Burnett (Oldsmobile's advertising agency) and ImageZone (the audio-visual production company handling various aspects of Oldsmobile's traveling trade show exhibit), and asked to design a kiosk system from the ground up. Similar systems being used by other car manufacturers (such as Mitsubishi and Buick) were based on computers such as the Apple II and IBM PC, and we studied these to determine what was needed to make the system informative and fun. We found that the existing systems used minimal graphics and sound, relying primarily on text-based on-screen information. System designers had paid little attention to the entertainment aspects of human-computer interactions. Since auto trade shows tend to be very loud and garish, with each exhibitor vying for the attention of the crowds, we had to design something that was alluring and easy to approach, full of color and sound and information. Sort of like television, we realized.

THE KIOSK IN ACTION

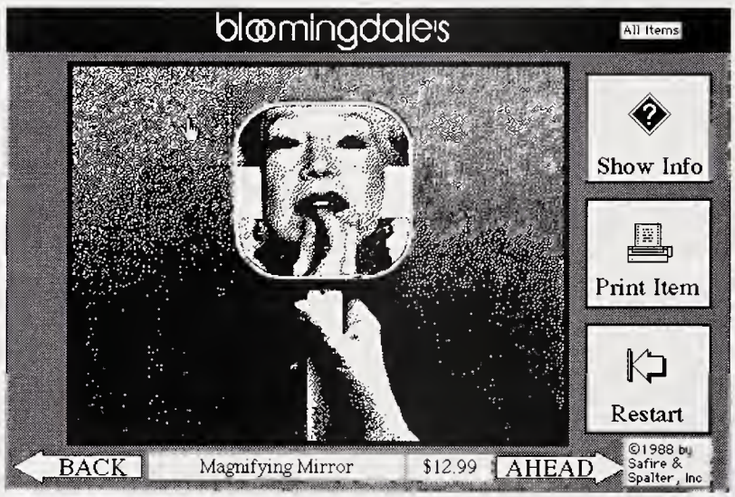
The general flow of the system is straightforward: An attract routine (which is a sexy animation) brings people over to the kiosk, and once they touch the screen, the system begins a couple of minutes of noninteractive animation, welcoming the user and displaying some general information and instructions on how to use the system properly. After the intro, the first screen of the interactive portion of the kiosk appears.

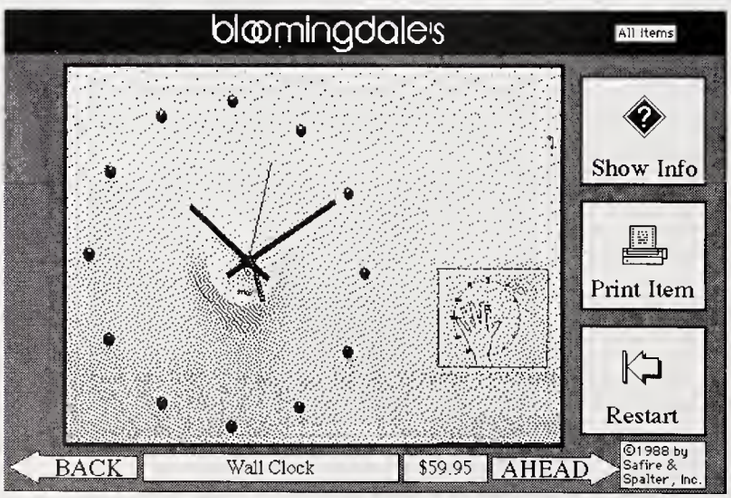
The advertising and production agencies (besides Oldsmobile) didn't care what computer was used to create the software — they just knew what they wanted to

Continued on page 56



The Automatic Retailing Machine (ARM) at Bloomingdale's lets shoppers "browse" the Consumer Electronics and Small Electronics departments by touching buttons on the screen. Quick animations such as the woman applying lipstick or the clock's hands sweeping keep users interested in touching the screen.





Bloomingdale's Automatic Retailing Machine

■ *by Anne Morgan*

When Safire & Spalter began the Bloomingdale's Automatic Retailing Machine (ARM) project, we wanted to start a revolution in the retail industry by changing the way people shop. The ARM offers a new level of customer service as well as a completely new internal training and marketing tool. Our inspiration came jointly from the ideas behind HyperCard and the enormous success of automated teller machines in the banking environment. Just a few years ago people had to wait on line in the narrow 10am-to-3pm time span just to withdraw cash from their accounts. Today, with ATMs, the idea of doing that seems ludicrous. We believe that five years from now shoppers will be able to avoid waiting on long lines because they will have access to the same level of customer service that they presently receive from their banks. Our goal in designing the ARM was not to start a business or to make a lot of money. It was to make our idea come to life.

The Automatic Retailing Machine at Bloomingdale's New York flagship store is probably the most used Macintosh in the world. Over 150 people use it every day. It has been written about in *Business Week*, *The New York Times* and other publications, and has been discussed on television and radio. *Macworld* magazine called it "one of the most intelligently targeted HyperCard projects to date."

While developing the ARM, we did extensive research into ATMs at banks. Interestingly, we found that they are used mostly in large cities and by people under 30 years old. Much of the public has a phobia about computers and aren't willing to become involved with them in any way. So our Mac-based system had to look more like a TV than a bank machine.

THE STACK IN ACTION

Designed to let shoppers "browse" through illustrated descriptions of items available in the Consumer Electronics and Games & Hobbies departments, this HyperCard stack—armed Macintosh SE has a touch screen for ease of use and will print out a product description for the customer to take to the sales floor to precisely describe the item of interest. Animated sequences developed with VideoWorks software

Anne Morgan is art director of Safire & Spalter, Inc. in New York City.

Contacts for "Interactive Artistry"

VideoWorks II
MacroMind
1028 W. Wolfram
Chicago, IL 60657
312-327-5821
$295

HyperCard
Apple Computer Inc
20525 Mariani Ave.
Cupertino, CA
95014
408-996-1010
$49

13" Apple RGB Monitor
see HyperCard listing
$999

Apple Extended Keyboard
see HyperCard listing
$229

QuicKeys
CE Software
PO Box 65580
W. Des Moines, IA
50265
515-224-1995
$99.95

Microtouch Touchscreens
Microtouch
10 State Street
Wooburn, MA
01801
617-935-0080
from $395-$995

Micronet 173MB Hard Drives
Micronet
13675-A Alton Parkway
Irvine, CA 92718
714-581-1201
$2245

Bose Video Roommate Speakers
Bose Corporation
The Mountain
Framingham, MA
01701-9168
508-879-7330
$279 a pair

Incredible/ Interactivity
18 West 23rd St.
3rd floor
New York, NY
10010
212-627-3321

make the ARM more interesting and "friendly" than a static display.

The technology exists right now that could make the system at Bloomingdale's fully automatic (with a bar code reader, a credit card reader and so on) The unit could be stationed anywhere, say North Dakota, and people could view objects, receive information and place orders. The ARM stack is a move toward this end.

THE BUSINESS DETAILS

Ours is one of the few stacks that has been sold to a major corporation. The experience of marketing a stack in the business world (to people who had never used a Macintosh) made us see the HyperCard program from new angles. Here are a few things we discovered that may be of help to other computer consultants and entrepreneurs:

• One of HyperCard's most intriguing qualities is that it lets you arrange and present things in new ways. It makes it possible to present things on the computer that wouldn't have been considered as candidates for presentation by computers in the past. In our stack, for instance, the HyperCard philosophy of navigation by interaction and association meant that we could produce a visual catalog that could present information in ways that no store catalog ever had before — images and words connected and combined o construct a kind of nonlinear database. Once you start working with HyperCard, it's easy to imagine many of the routine parts of business, from outside presentations to internal reports, organized in entirely new ways.

By taking advantage of this relatively new way of presenting information, we were able to create an application that was more informative and easier to navigate than a catalog, and also much more entertaining.

The background processes in HyperCard can add further value to business applications. We can track every user interaction and print out the results in numerical tables or graphs (combining words, images, *and numbers*). Knowing which categories are the most popular, what items are sought for the most, what pictures get printed out, is valuable for marketing and training purposes.

• We've found that the business environment is not interested in new technology for its own sake. One of the difficulties HyperCard programmers face in marketing stacks is that they get can see interacting with the computer and investigating the stack as an end in itself. A business, however, sees the Mac and HyperCard as a means of accomplishing some specific task. Our marketing director, Michael Spalter, did an excellent job of selling this ARM idea in part because he is neutral on the subject of the Mac — he doesn't program, and he rarely uses a computer for anything other than word processing.

In fact, the more we disguised the fact that there was a computer involved at all, the more acceptable it became to both Bloomingdale's and their customers. The computer is inside a kiosk through which only the screen of the SE is visible. We used a touch screen so that no keyboard or mouse would be necessary. The interface is completely intuitive. It was tested on a range of people, including my grandmother, who is 82 and had never used a computer before. The salespeople on the floor refer to it as "the T.V."

• In retail (and other business environments) people who use an application don't want to have to figure things out. The difference between designing a stack for an avid Mac owner to use and one for a busy professional is like night and day. This applies not only to shoppers at Bloomingdale's, but to doctors, lawyers, bankers and the rest of the business world. The first incarnation of our stack had many buttons on each card and was pretty complex. After extensive testing and revision, our final version has three main buttons and is very simple to use.

• Because creating a HyperCard stack combines so many different types of information, words, pictures, numbers, animation, and sound, we benefited from having in our company people with varied backgrounds. I was trained in studio art and mathematics; James Joaquin is a Mac programmer working in C, Pascal and other programming arenas; Mark Safire is the HyperCard master who wrote scripts and did the overall program; and Michael Spalter is gifted in marketing and public relations. All of these abilities were necessary to create the interface, incorporate XCMDs to make the stack easier to use, write the program and then see it come to life out in the real world.

• Our goal was esoteric, and it was a unique experience to bring HyperCard into the business world (see above). Our overall business methods, however, were quite traditional and practical:

Communicate — Try to reach as many high-level people within an organization as possible.

Make the goals of the project clear — This is especially important, because many people find computers mysterious and don't necessarily understand what they can do.

Get people involved and committed — We spoke every day to the salespeople working on the floor, the department managers and others. These are the people who finally determine whether or not the project will work out. By involving them you lessen the risk of abuse to the machine, and create a positive attitude toward it.

Maintain your own commitment — We were paid only after the system was up and running, so we were motivated to keep going. Your commitment to the project and your determination to make it work created commitment on the part of the company.

Help people get comfortable with change — What we started was revolutionary. Helping people become used to the change is important. They will have to change the way they think about "computers" and about what a computer is capable of doing, and you will have to help them change.

INTERACTIVE CHANGE

Safire & Spalter, Inc. set out to introduce a paradigm shift in the retail industry by changing the way people think about the nature of shopping. We achieved our goal by introducing the ARM into Bloomingdale's and expect the idea to spread across the country. There are many uses, though, for HyperCard in the business world, and the ARM is only one of them. We look forward to seeing many new applications that cause real changes in the ways that people go about their lives.

Stevens, continued from page 52

We based our stack on NASA remote sensing imagery, which is not only beautiful but informative. However, the sheer number of published images is overwhelming, and the related information is hard to find in reference books. By using HyperCard, we were able to construct a resource that not only presented the images but gave instant access to related information. Unlike a book, Polar Sea Ice can set the images in motion and display an entire time series at the press of a button. This enables the viewer to get an idea of the "big picture" that is key to understanding the specifics. We layered the information so the user could zero in on specific details and even go to a comparison set. Designing these resources is not only a challenge to our graphic communication skills but an invitation to a new way of seeing and learning.

THE TECHNICAL DETAILS

The Polar Sea Ice stack was constructed on a Mac II with 5MB of RAM and a SCSI hard disk, using HyperCard 1.2, VideoWorks II and VideoWorks II HyperCard Driver. The images were imported through a Sharp JX-450 scanner. There were five stacks in the presentation: an opener, an introduction, a comparison stack, the Antarctic stack and the Arctic stack. Each stack can either function on its own or be linked to others. The modular nature of the system allows us to expand or reduce it to compensate for equipment limitations or to adapt it for various presentation purposes.

INTERACTIVE SCIENCE

The Polar Sea Ice demo has been shown for NASA, the U.S. Geological Survey (USGS), and other clients. Since hypermedia is a relatively new concept, we felt it was important to develop a piece which would demonstrate some of the aspects of hypermedia in a scientific context. Polar Sea Ice has been very successful in stimulating interest in this new information-navigation approach. Currently we are in the preliminary stages of developing a HyperCard/hypermedia prototype for an arctic digital data journal with the USGS and other cooperating agencies and universities. The goal is twofold — to assess the effectiveness of the CD-ROM format for a journal and to develop a directory and data access for a pilot.

Payson R. Stevens, who directed Polar Sea Ice and wrote its text and music, is president of InterNetwork, Inc., a science/communications/media group in Del Mar, California. Edward P. Coderre designed and scripted the demo project, with the assistance of Patrick J. Howell, Michel Kripalani and Mitch Okawa.

Biedny, continued from page 52

achieve, and wanted to buy the computer that best fulfilled the purpose. We chose the Mac II.

THE TECHNICAL DETAILS

We based the entire system on a HyperCard shell, which provided the intelligence to handle the information contained in the various pricing databases. The VideoWorks driver for HyperCard was used to bring in full-color graphics and animation to the otherwise black-and-white HyperCard world; both normal and accelerated VideoWorks files were used throughout the system. A variety of HyperCard XCMDs were used to hide the HyperCard window boundaries, provide zooming rects and allow QuicKeys commands to be triggered from HyperTalk, among other things. The Reports function was used for final output — to work around the severe formatting and data-handling limitations of Reports, we programmed the stack so the output data is processed through a series of HyperTalk routines before hitting Reports. This allows intelligent page breaks, indented bulleted subitems, continuation footers and so on. The stickers are printed on legal size forms preprinted with the color Oldsmobile logo, and a disclaimer on the back of the sheets.

We took care to ensure that the buttons and controls in the software took advantage of the touch screen — we were able to achieve a graphic effect which we haven't yet seen anyone duplicate in HyperCard. We also used a custom desktop background (consisting of blue and green stripes, and a miniature Oldsmobile logo), which helped us create the illusion of full-screen HyperCard. And we made the background "build up" by means of a slick animation that ended in a perfect duplicate of the desktop picture.

We used 8MB Macintosh IIs with 13-inch Apple RGB monitors, LaserWriter NTs, Microtouch touch screens, Micronet 173MB internal hard drives (these are based on the CDC Wren IV hard drive platters, which are famous for their access speed and durability; our drives had to constantly load huge animation files and survive the tortures of road travel, and they fared quite well at both), Bose Video Roomate speakers (the Video Roomates have extra shielding that let you place them right next to a video monitor with no ill effects, and one of the speakers has an external volume pot) and custom enclosures built by the guys that work at the Olds prototyping and bodyshop plant. Four heavy-duty fans keep the inside of the enclosure cool. The keyboards are covered by custom Plexiglas covers, which block out all keys on the Apple Extended keyboard except the main alphanumeric pad (We are programming macros into the next version of the software that can be triggered from the function keys, permitting us to provide automated long-distance tech support to the Olds showfloor staff).

Sounds, including music and voices, were digitized with Farralon's MacRecorder hardware. In order to get the best possible sound quality out of the limited 22 kHz sampling rate of the Mac, we recorded human voices onto a Tascam PortaStudio 2 multitrack tape deck, and then processed the sound through an Alesis Midiverb II digital delay. This was then input directly into the MacRecorder, completely bypassing its own built-in condenser microphone.

When the computer is started up at the beginning of the day, the system displays a maintenance screen that allows the Oldsmobile booth staff to adjust the volume, time-outs (if someone begins going through a tour and then walks away, the computer waits a predetermined amount of time, repeats the voice prompt for the particular screen a specific number of times and then sets itself up for another customer) and touch-screen calibration controls. There is also a button that permits viewing of the consumer database (as each show attendee finishes a tour, the computer prompts for their name, address, and so forth, which are stored in a database that can later be printed or exported), as well as restart and shutdown buttons (some more XCMDs).

INTERACTIVE PROFIT

The response to the Oldsmobile Consumer Computer has been outstanding — people simply love it. Show-goers formed long lines to get their hands on the machines, proving that multimedia can be fun and profitable.

David Biedny is president of Incredible/Interactivity, a multimedia production and consulting firm located in Manhattan, New York.

BEYOND THE TOY BOX

■ *by Steve Hannaford*

detest the term *multimedia*.

Perhaps it's because I'm a writer. Traditionally, when there's more than one medium involved in any enterprise, writing gets short shrift. Take film, for example, where the screenwriter's lowly lot is fabled. Where what makes sense from a writer's point of view is generally the last thing that's considered, and where the writer traditionally has a status somewhere between the makeup staff and the caterer. Or take television...please!

Not that the writer's ego is the main thing — far from it. Nor that it's impossible to reach a high level of artistry without much in the way of good writing. But without a proper framework (a good script), it is too easy for any presentation to degenerate into a series of technical effects without any coherence.

Good writing is, of course, not the only source of structure available. Ballet, probably the oldest mix of media, can retain coherence through music, even when that music has no explicitly narrative form. And good writing for nonliterary media, let's say the script for *Citizen Kane* or even that for *Casablanca*, can add extra layers of depth.

But the big problem is the overemphasis on technique to the detriment of meaning. The new multimedia offers a never-ending supply of toys for our use, a range of toys that is constantly being expanded and improved. Video disks, frame-capture devices, animation tools, sound compression, high-res color monitors and high-quality sound output — it's all too easy to fall in love with the toys for their own sake, and forget that they are means to an end, not ends in themselves. And as the president of Memphis College of Art, John Slorp, says, "The technical fascination with multimedia tools reminds me of the big problem in photography — everyone claims that if they had a longer lens or a better camera, they could make a better picture." But while technical perfection is desirable, it certainly should be secondary.

As Slorp maintains, "The search for content is still the ultimate thing in all art." But we all know that collecting any real content can be painfully slow. "The reason you see a lot of razzle-dazzle and not so much content," affirms Jane Wheeler of The Voyager Company, "is that content is expensive, in terms of works and in terms of rights."

In the commercial world, the concept of "we gotta get a videotape (slide presentation, HyperCard stack, you name it) for the sales department" often originates in the absence of any idea of what the ultimate intention and expected benefit of the product is. I know of one software company that spent several hundred thousand on an elaborate video tutorial for its product (so much because they kept changing the specifications and running up time at an hourly rate), only to discover that the release of the tutorial for the first version of the product would coincide with the release of the second version of the product, much altered. They ended up just tossing the whole project in the trash.

There's always danger in perfecting the sizzle before you bring home the bacon. At the recent National Computer Graphics Association show, Apple showed off its multimedia capability on the Mac, every half-hour, with a high-on-production-values presentation about the Mac and graphics, using video, still presentation graphics, sound and a slick presenter who "interacted" with the people in the video. Like so many trade show productions, the multimedia event was a technical tour de force and, at the same time, laughably crude, ugly and obvious. I shudder to think what will happen in the next 12 months, when anyone will be able to get their hands on this equipment and create such presentations at will.

"There's a huge gap," says Joel Slayton, Associate Director of the CADRE Institute at San Jose State University, "between the technical expertise to do something like this and the creative, inventive expertise of the designer to put something into this technology."

Having the medium determine the message may be good retread McLuhanism, but it can make for lousy marketing and still worse art. An obsession with technique over substance and form results in vapidity. In no area do we see this more evidently than in the parallel field of computer-based education, an area where the results have far underperformed the promises.

Computers and Education

ne of the constantly expounded and never fulfilled promises of the computer age has been the manifestation of the supposed educational benefits of the computer — the dream come true of education machines that would put new realms of information at our fingertips and allow us to learn at our own pace without the intermediation of a third party.

The problem is that, by any objective standard, educational computing has been a disaster. I worked at one time with the most ambitious of computer education projects, the mainframe-based PLATO system, into which Control Data poured (sank, rather) piles of money. I can't say what all PLATO educational programs were like (though I plodded through a bunch of them, from COBOL to Accounting to Spanish), but the ones I tried were no way to really learn anything, useful only perhaps to spot-check your knowledge. Many other such programs are similarly dreary ordeals or (at best) moderately pleasant time-wasters. Microcomputers, and especially the Macintosh, offer better environments for learning. At least with terminals that can display more than text, it's possible to create educational models more sophisticated than the multiple-choice test. And while some current microcomputer educational programs are passable, the vast majority simply promote rote learning, perhaps in a graphic rather than a purely verbal approach. Shooting down space invaders or getting self-conscious positive reinforcement like a rat in a Skinner box (dancing rabbits or 'atta boy's in synthesized computer speak) has only a limited appeal, to my kids at least. As Walter Reinhold, NYU music professor and spokesman for Cultural Resources software development company, says, "Most of the educational programs out there now are absolutely appalling."

Part of the problem, and some of the problem with our schools — but don't let me get started on that — is the excessive linearity of the standard educational model. You know, the kind of attitude that determines that children be given graded readers with basic vocabulary, so that they get no fun or curious words until they've mastered all the dull, drab, little ones thoroughly, so that *platypus* and *brachiating* and *gneiss*, words you can get your teeth into, don't get any exposure at all. When people have used computers to reinforce this rigid view of knowledge acquisition, they've managed to kill off virtually all real curiosity. The best educational programs are simple word processors, paint programs and card and strategy games (my six-year-old is getting great at both computer and real — on the dining-room table — Yahtzee).

But the most hopeful process may be going on in a fusion of

these two areas of the computer that I sorely distrust — computer-based education and multimedia. A number of innovative designers and teachers of design are finding ways to combine a real environment for learning with a real substantive use for multimedia. And the secret to all this may be the often-maligned HyperCard interface.

There is always danger in perfecting the sizzle before you bring home the bacon.

HyperCard

nly now that the flood of address books and calendar planners created with HyperCard has subsided, has a set of innovative and aesthetic uses of the medium started to appear, that at once give promise for education and for multimedia. I have seen, for example, what appears to be the first master's thesis written entirely on HyperCard, an MFA thesis by Diane Kruse in a program called Visual Informational Arts at Memphis College of Art. The subject of the thesis is the promise and uses of hypermedia, especially in education. The project, which includes video, sound and scanned images is a good first example of its own subject. It contains numerous striking and effective digressions on a whole set of subjects from haiku to Irish art of the Middle Ages.

One of the most cogent points made in the thesis is on the subject of the extralinear character of HyperCard and how it extends the thought process beyond the sequential and linear processes of normal chapter-by-chapter books. The thesis illustrates (literally) the subjects it touches on, and the reader can follow any of a wide set of sequences in reading it.

As John Slorp maintains, hypermedia is an excellent development ground for art. "The extralinear sense of artists' ideas is very expressible in a hypertext situation. Artists have to start in the middle of things and work out in all directions, like an explosion of ideas." Hypermedia avoids the traditional beginning, middle and end of normal writing, and leads to a more associative development of ideas.

A similar approach is taken for the excellent set of Voyager Company projects. These include such products as a videodisk catalog for the National Gallery of Art in Washington, which allows you to browse through the collection of the museum, and a Van Gogh disk that presents the work of the painter along with commentary and background on it. The company is working on similar projects with the Louvre and the Chicago Art Institute. Another recent project is an annotated version of Beethoven's Ninth with a musicological study of its parts.

In all of these cases, the ability of the user to browse or randomly access images or data is critical. According to Jane Wheeler, head of software development for the company, "The things that we do are quite open-ended. You don't have to follow a particular pathway for using them. You can spend 10 minutes, or you can ask the National Gallery of Art collection to keep showing you things for hours, and it will continue to do it. The content is so important."

And this browsing ability puts the audience into a less passive stance. "To my mind," says Joel Slayton, "the line between author and audience is diminishing significantly with a product like HyperCard." The designer has to take into account the independent will of the audience. "You have to design a product that you lose control over on purpose." In the best sense, the designer has to allow for the user to educate him- or herself.

The National Gallery stack, for example, is being used in many, unpredicted ways. It was a resource, for example, for children at the Open School in L.A., who were doing a project on designing cities. They used the images available from the National Gallery disk as a jumping-off point for discussing the topic. One school uses the disk in a studio art class to show how you can use elements like rhythm and repetition in art. The teachers let the students have access to the National Gallery images, they say, "Find images that show you these techniques," and then they discuss them. In this way, they include art history and aesthetics in the studio arts class, making the students see the art works with a more concentrated vision.

But in spite of this use, the Voyager projects are not technically curriculum pieces. Says Wheeler, "What we are interested in is discovery learning. Our projects, though they're used by teachers and we encourage teachers to use them, are not curriculum pieces."

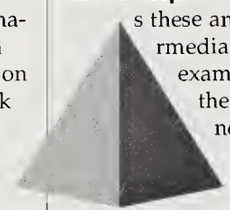
Similar projects to Voyager's have been created by Jim Sheldon of Addison Gallery in Andover, Massachusetts. He has already created two videodisks as integral parts of museum exhibits. One of the exhibits was of Muybridge photographs. Muybridge did early still photographs of men and animals in motion. There are famous sequences, for example, of jumping horses. What Sheldon created was a sequence of animation of the stills combined with other background information on the artist, and he made this disk part of the exhibit.

Even more ambitious was a videodisk created in connection with a retrospective on a sculptor. The videodisk documented, in catalog form, works both in and not in the show. Sheldon also taped the artist talking on various subjects. Using the disk, you can seek the taped segments where he was talking, for example, about realism, or influences. The disk also included images of the artist working in the studio. The disk was integrated as part of the show but also serves as a catalog for it. This disk preserved the show in a way that printed catalogs never can. And with sculpture, the ability to move around an object in video rather than just see a still photo of it is particularly appropriate.

On another level, a HyperCard stack called *Culture 1.0* (see "HyperGallery," page 28) has been put together by Walter Reinhold and released by Cultural Resources. This stack takes a "cultural literacy" approach to Western civilization from the Middle Ages, and offers pictures of paintings and sculptures, samples of music, and descriptions of the cultural history of key periods, figures and events in science, politics and cultural history. The stack is amply cross referenced, including for example, an almanac with significant events (births, first performances, saint's days) for every date in the year. Most exciting is its ability to show, for example, who the contemporaries of Beethoven were in France, or who was writing in England when Gainsborough was painting.

The stack is a meritorious first try at this (the company plans to extend it to videodisk, supplementing it significantly), and is fun to browse through and make connections with. Reinhold says that he gets letters from users who claim they're addicted to the linking process. Again, the associative approach makes it very different from plodding through a textbook. To a limited extent, at least, the reader is capable of making his or her own connections.

Not To Despair



s these and other hypermedia/multimedia examples trickle out, they offer real hope, not only for the future of the genre but also for the future of education. And several schools like Memphis College of Art and San Jose State are clearly taking the approach that they are in the business of training people to create these new media in a way that fuses technique and artistry. "We want to have impact on the individual, not on the tools," says San Jose's Slayton. "Our students are not going to be limited by a set of operator's skills."

John Slorp compares what his school is doing to what the Bauhaus movement did in Germany between the wars. "The Bauhaus took a look at the industrial revolution and said 'the world is becoming junk. Let's take a responsible action and reiterate the sense of good design, appropriate form and creative effort within the world of modern industry.' That's where an art school belongs today, also, if it is taking a responsible stand. A lot of this multimedia stuff is vacuous and junk, but there is potential here for art and we are going to explore it."

continued from page 48

applications in short, practical examples, warnings and tips and techniques for expert use. The book covers the design capabilities of Adobe Illustrator 88 and has an annotated gallery of examples with some illustrations in color. $22.95. Addison-Wesley Publishing Company. Reading, MA 01867, 617-944-3700.

MacBooks Catalog

MacBooks is a direct-mail bookstore devoted exclusively to selling Macintosh computing books and general-purpose desktop publishing books at discount prices. Featuring over 300 titles, 24-hour shipping for in-stock books and access via phone, FAX, MCI MAIL or modem, the outlet also offers highlights and reviews on new and forthcoming books. The MacBooks catalog is available on request, in HyperCard format or in print; it's also downloadable from its BBS. Free on request. MacBooks, 4228 Darlington Court, Palo Alto, CA 94306, 415-494-2154.

The Videodisc Monitor

This newsletter focuses on nonconsumer industrial, governmental and educational uses of interactive video and related technologies, emphasizing new products, market statistics and comparative analyses. Each story includes complete contact information. Future Systems offers subscribers discounts ranging from 10% to 50% on many of its products. $247 for 11 issues. Future Systems Inc., *The Videodisc Monitor,* P.O. Box 26, Falls Church, VA 22046, 800-323-3472.

The Makeover Book: 101 Design Solutions for Desktop Publishing

by Roger C. Parker

A collection of "before-and-after" graphics treatments, this book offers hundreds of illustrations with tips and tricks for improving the look of newsletters, advertisements, letterheads, business cards, corporate logos, sales brochures and so forth. Side-by-side layouts provide the reader with an assortment of improved dtp makeovers, accompanied by comments that explain the techniques used. $17.95. Ventana Press, P.O. Box 2468, Chapel Hill, NC 27515, 919-942-0220.

Bureau of Electronic Publishing Product Guide

In addition to its extensive catalog of CD titles, the *Guide* lists related equipment and services: CD-ROM drives, accessories, documentation and qualified product support. Also inside is information about CD-ROM technology, hardware and the industry as a whole. $4.95. Bureau of Electronic Publishing, P.O. Box 43131, Upper Montclair, NJ 07043, 201-746-3031.

CD Data Report

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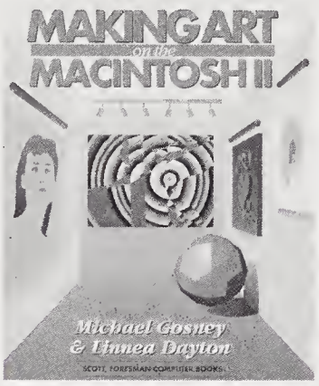

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– Frederick E. Davis, Editor-in-Chief, *MacUser*

"Making Art on the Macintosh II is one of the few books which goes beyond re-writing program documentation and offers true value. It's one of the few computer books I've ever sat down and read cover to cover."
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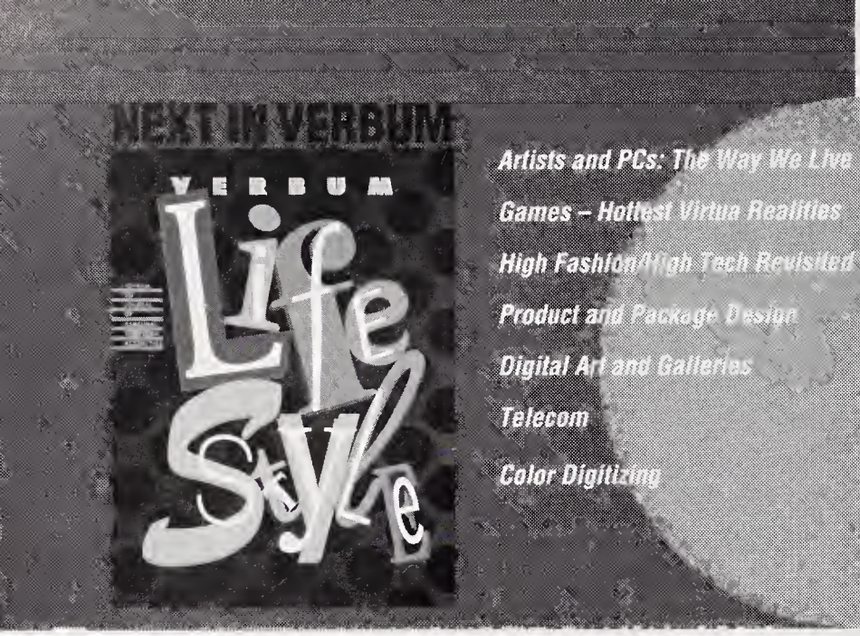

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ART SUBMISSIONS Send creative works with a 100-word explanation of the process used (including hardware and software used) and a 50-word bi_raphy, on disk and on paper (Macintosh format preferred, MS Word or MacWrite for text files). If work involves combined media, photostats, photos, or transparencies are welcomed. Please include a self-addressed, stamped envelope for return of the materials. Send to Verbum Art Editor.
CLASSIFIEDS $.50 per word, $20.00 minimum. Payment with order (VISA/MC accepted). Printed or typewritten copy only please; disk preferred (MS Word or MacWrite format). Send to Verbum Classifieds.

LETTERS What do *you* think? What do you want? What are your experiences, and how does *Verbum* fit in? Where are we headed? Make contact!

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VERBUM BACK ISSUES

1.1 Early 1987 The first *Verbum*, all black-and-white, 300 dpi laser output, beautifully printed on 70 lb. Sequoia Matte. This epic launch of the *Verbum* journal, designed with *PageMaker 1.2* by John Odam, inspired designers worldwide. • Featured artists: Avant-garde concept artist Paul Rutkovsky with redigitized illustrations, Mike Swartzbeck's trailblazing composite illustrations from scanned images, excerpts from David Brunn's *Irish Book of Invasion* using innovative digital photography techniques. • Columns: Michael Singleton's The Artist's Toolbox offers a primer on bitmapped graphics with a feature-by-feature comparison of leading programs. Behind the Scenes by Kim Criswell responds to the state of the industry circa January, 1987 with "Big World, MacWorld." "Painting by Numbers" by Tony Smith introduces the PostScript page description language. John Odam's "First Contact" takes *Fontographer* through its paces.

1.2 Mid-1987 This issue was produced with *ReadySetGo! 3*, 1270 dpi Lino imagesetter output, and digital color separations. • Features: "Amiga Video" looks at the unfolding possibilities of the animated Amiga. "Painting as Spiritual Discipline" by Jack Davis shares the artist's experiences with Japan's elegant painting program, *Mac Calligraphy*. "Big Blue Art" by Mike Kelly profiles the world of IBM graphics from the *Verbum* point of view. "Lino Seps" by Mike Saenz explores the new wave of digital color separation, featuring Marvel Comics' new *Iron Man* cover created by Saenz . "Digital Studies" by Australian Mac-artist Malcolm Thain captures the grace of passive and active female forms. • The usual "Gallery" of unusually inspired pieces. • Columns: The Artist's Toolbox compares PostScript illustration programs *Adobe Illustrator* and *CricketDraw* as well as two font editors and four special effects programs. "Desktop Techniques" by John Baxter looks at parallels between low- and high-tech graphics tools.

1.3 Late 1987 The third *Verbum* was produced with *PageMaker 2.0*. More pages, more color, a very dense issue, the first to be sold in quantity on the newsstands. • Features: April Greiman's "Pacific Wave" sculpture/exhibit in Venice, Italy. "Desktop Video." "Continuum" by Linnea Dayton explores the future of *Verbum*. Dominique de Bardonneche-Berglund, Europe's digital painter of renown. Jack Davis explores *ImageStudio*. "Creative Waveforms" by Neal Fox focuses on music. • Columns: Tony Smith on 3-D with PostScript. The Artist's Toolbox compares object-oriented programs on the Mac. John Odam's First Contact treats *Adobe Illustrator*, including a color piece. Behind the Scenes covers people and industry news of note.

2.1 Winter/Spring 1988 The first color cover features an *Illustrator 88* piece by John Odam, digitally separated. Ever more color and new columns: "Against the Grain" by Steve Hannaford offers a practical counterpoint to *Verbum's* creative excitement, with technical/economic guidance. "Stackware Party" by Linnea Dayton reviews artistic HyperCard stacks. • Features: Lawrence Kaplan's "Hot-Tech" prints, "The Fine Art of Dot-Matrix Printing" by Nira, "PC 3D Showcase" by Jack Davis, "Color Output Options" by Erfert Nielson. • Columns: John Odam's "First Contact" explores Aldus *FreeHand* with color illustrations, all digitally separated.

2.2 Summer 1988 *Verbum's* first cover theme is "Fashion" with a Jack Davis cover illustration done in Adobe *Illustrator*, and a major article on PC Fashion Design. • Other features include: "Mel Ristau's Electroglyphs" - iconic PostScript illustrations, "Georgeanne Deen's Rock and Rolling Amiga," "Sound Sampling Sensation" by Neal Fox and a how-to on shooting slides off your high-resolution monitor. • Columns: "Against the Grain" gets to the "bottom lino" of the imagesetting business; "First Contact" treats *Illustrator 88*.

2.3 Fall 1988 "Space" concept issue features a survey of Architectural CADD apps on the Mac and IBM-pc, with a "Living Space" gallery in kind. Space theme is also followed with an "Outer Space" gallery of cosmic visions by Ron Cobb and William Lombardo. The regular ("Art Space") gallery features landmark *PixelPaint* works by Dominique De Bardonneche-Berglund, Bert Monroy and Ikeda Tomoyo, digitally separated with *PixelPaint 2.0*. Nicholas Mac Connell and Linnea Dayton travel to Inner Space with "Through the Silicon Looking Glass," an exploration of pcs as mind machines. • Columns: John Odam experiments with *PixelPaint* (all digital seps). Against the Grain takes a hard look at digital color seps.

3.1 Winter 1989 Special issue on "The Word" explores writing, editing, publishing and typography, with Jack Davis' "Initial FX" on special effect initial caps, Mike Kelly's "Grammar and Style Checkers," a parody on "Third-Generation Software for Writers" by Michael Rossman and the first *Verbum* interview with the intellectual program *Racter*. • The Gallery features image-laden poetry and poetic images. • Columns: John Odam's First Contact takes a second look at *Fontographer* and font design. Steve Hannaford covers the font explosion and industry trends for typography.

PRODUCTS

Verbum Digital Type Poster
Designed by Jack Davis and Susan Merritt, this deluxe five- color, 17" x 22" poster showcases the variety of digital type effects possible on the Macintosh. It was produced on a Mac II with *PageMaker 3.0*, output on a Linotronic L-300 and printed on a 100 lb. coated sheet. The text explains the history of initial caps in publishing, and how each sample letter was created. A framable "illuminated manuscript" for every electronic design studio. *Limited edition of 2000. Shipped in capped tube.* **$10.00 postpaid.**

Verbum Stack 1.5 1988 update of the seed of a hypermedia journal. Packed with art, it has received rave reviews for design innovation. All registered owners will receive notice of the first module, which will contain a PC Art Resources database, the Hypergallery of innovative creative works and other trailblazing features. **$10.00 postpaid** (registered owners send $4.00 for update).

Making Art on the Macintosh II by Michael Gosney and Linnea Dayton. Written by the editors of Verbum, this book is the comprehensive reference for graphics on the Mac II. All major software and hardware products are covered. Processes are described and shown with extensive galleries of creative works from top artists and designers. The book features a 16-page color signature packed with inspiring art samples and informative captions. An invaluable guide for all Mac owners. 336 pages, **$22.95** (plus $4.00 shipping/handling).

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William Lombardo, Modelmaking & Illustration
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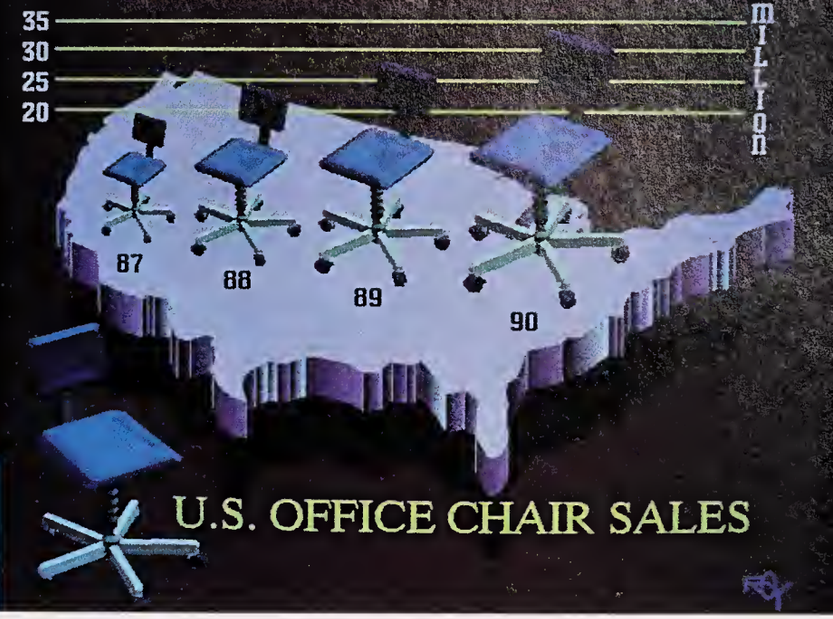

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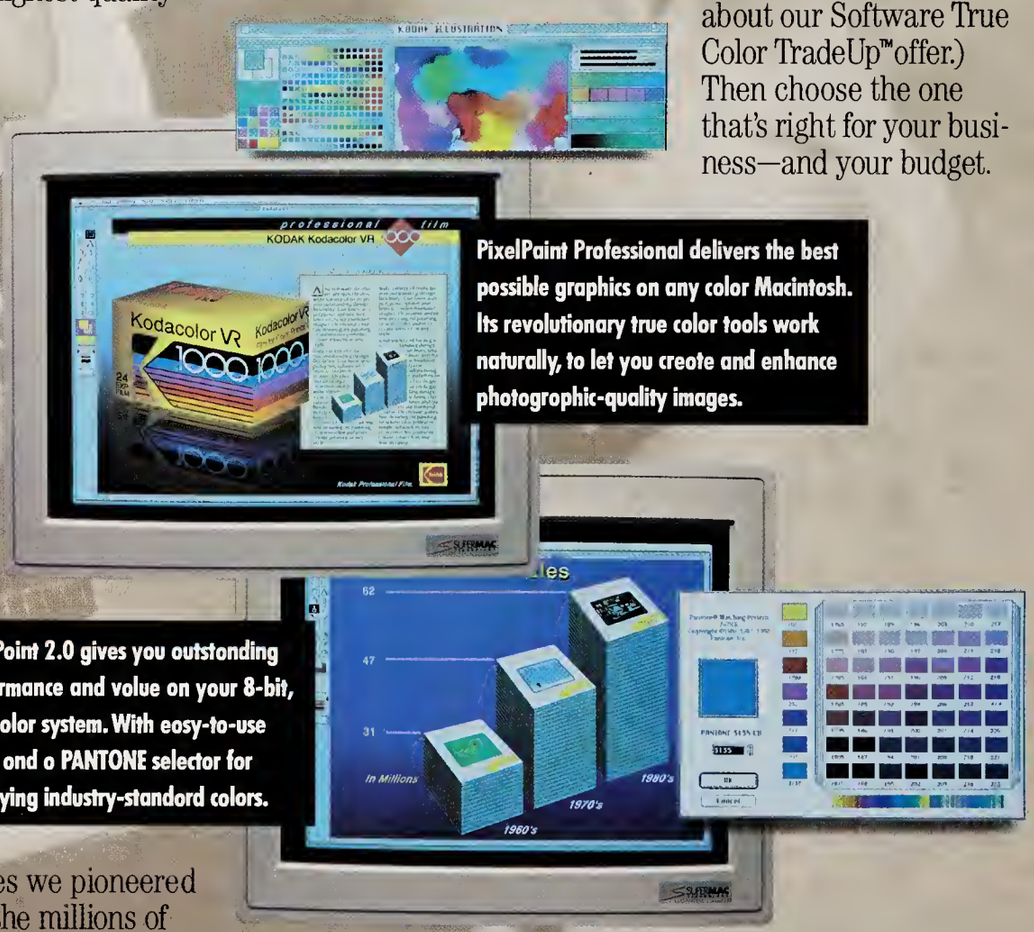

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